

Appendix I

High Priority Site Subwatershed Analysis

(2008-2010 and 2010-2012)

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High Priority Site Subwatersheds (2008 – 2010)

I. DUCK CREEK @ HWY 4

Management Plan Constituents

Priority A/B

- Chlorpyrifos
- Diazinon

Priority D

- *Ceriodaphnia dubia* water column toxicity

Priority E

- Dissolved Oxygen
- pH
- *E. coli*
- *Selenastrum capricornutum* water column toxicity

Description of Duck Creek Site Subwatershed

Duck Creek @ Highway 4 (10,746 irrigated acres) – This site is located just to the east of the city of Stockton. Duck Creek drains a section of southern San Joaquin County between Stockton and the Lone Tree Creek site subwatershed. During the summer flow is typically low in the creek. The creek channel was dredged over several months early in the 2007 irrigation season. The predominant land uses for irrigated agriculture are field crops and irrigated pasture. There are also a relatively large amount of deciduous nuts in the site subwatershed and truck farm/nursery and berries are also grown. Figure I-1 illustrates the land use within this site subwatershed area. This site subwatershed includes an upstream location (Duck Creek @ Drais Rd) which was sampled in 2008. Table I-1 includes the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

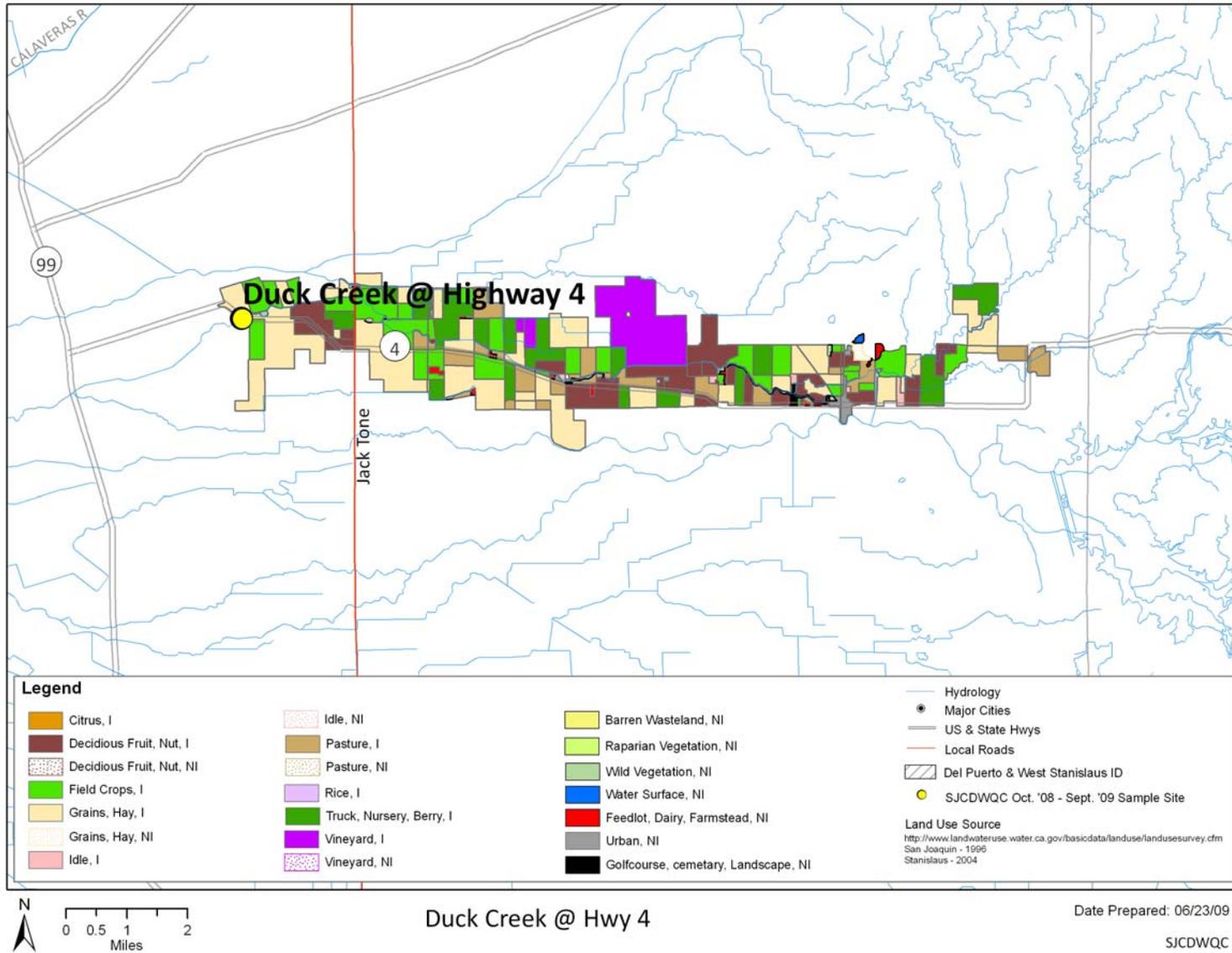
Table I-1. Coordinates of the Duck Creek site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Duck Creek @ Highway 4*	531XDCAHF	37.9491	-121.1810
Duck Creek @ Drais Rd ^U	531XDCAHR	37.9348	-121.0841

*Original SJCDWQC sampling site

^UUpstream sites

Figure I-1. Site subwatershed map of land use for the sample site at Duck Creek @ Hwy 4.



Subwatershed Monitoring History

Monitoring at the Duck Creek @ Hwy 4 site began during the irrigation season of 2004. This location was removed from the monitoring program in 2005 and the Coalition restarted sampling at Duck Creek @ Hwy 4 during the irrigation season of 2006 and continued through the irrigation season of 2009 (Table I-2). Specific information on the analyses conducted across each of the monitoring seasons is provided below (Table I-3). Duck Creek @ Hwy 4 is an Assessment Monitoring location under the current MRPP and is scheduled to be monitored in 2011. Management Plan Monitoring (MPM) will be conducted during 2010 at this site.

Management Plan Monitoring for the Coalition was initiated at Duck Creek @ Hwy 4 in June of 2007 (Table I-4). Management Plan Monitoring occurred at Duck Creek for chlorpyrifos during the 2007 and 2008 irrigation seasons and for chlorpyrifos, *Ceriodaphnia dubia*, and *Selenastrum capricornutum* during the 2009 irrigation season (Table I-4, Table I-5, and Table I-6). A summary and discussion of all exceedances throughout the years are provided in the next section (Table I-7).

Walker Slough, the most immediate downstream water body, is listed as impaired for pathogens due to urban runoff/storm sewers and recreational and tourism activities. Duck Creek is currently listed under the proposed 2008 Central Valley Basin Plan 303d list of impaired water bodies for chlorpyrifos (source: agriculture), *E. coli* (source: unknown) and mercury (source: resource extraction).

Table I-2. Duck Creek @ Highway 4 sampling events per season and year.

	2004		2005		2006		2007		2008			2009		
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	2	NA	NA	NA	5	2	6	2	6	2	3	NA	6	NA
Events Not Sampled	0	NA	NA	NA	0	0	0	0	0	0	0	NA	0	NA
Total	2	NA	NA	NA	5	2	6	2	6	2	3	NA	6	NA

NA - Not applicable. This site was not sampled during this season/year.

Table I-3. Number of analyses performed per analyte in each sampling season and year for the Duck Creek @ Hwy 4 sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2004	2006	2007		2008			2009			
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm*	Irrigation	Fall*
Field and Physical Parameters												
NA	pH	2	5	3	8	3	10	2	3		6	
NA	Specific Conductivity	2	5	3	8	3	10	2	3		6	
NA	Dissolved Oxygen	2	4	3	8	3	10	2	3		6	
EPA 160.1	Dissolved Solids	2	5	2	6	2	6	2	3			
EPA 160.2	Suspended Solids					1		2	3			
EPA 180.1	Turbidity	2	5	2	6	2	6	2	3			
SM 9223 B	E. coli	2	5	2	6	2	6	2	3			
EPA 110.2	Color	2	5	2	6	1	6					
EPA 415.1	TOC	2	5	2	6	2	6	2	3			
EPA 405.1	BOD		1	2	2							
Carbamates												
EPA 8321A	Aldicarb		5	2	6	2	6	2	3			
EPA 8321A	Carbaryl		5	2	6	2	6	2	3			
EPA 8321A	Carbofuran		5	2	6	2	6	2	3			
EPA 8321A	Methiocarb		5	2	6	2	6	2	3			
EPA 8321A	Methomyl		5	2	6	2	6	2	3			
EPA 8321A	Oxamyl		5	2	6	2	6	2	3			
Organochlorines												
EPA 8081A	DDD		5	2	6	2	6	2	3			
EPA 8081A	DDE		5	2	6	2	6	2	3			
EPA 8081A	DDT		5	2	6	2	6	2	3			
EPA 8081A	Dicofol		5	2	6	2	6	2	3			
EPA 8081A	Dieldrin		5	2	6	2	6	2	3			
EPA 8081A	Endrin		5	2	6	2	6	2	3			
EPA 8081A	Methoxychlor		5	2	6	2	6	2	3			

Method	Analyte	2004	2006	2007		2008			2009			
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm*	Irrigation	Fall*
Organophosphates												
EPA 8141A	Azinphos methyl		5	2	6	2	6	2	3			
EPA 8141A	Chlorpyrifos	2	5	2	7	2	6	2	3		6	
EPA 8141A	Diazinon	2	5	2	6	2	6	2	3			
EPA 8141A	Dichlorvos					1		2	3			
EPA 8141A	Dimethoate		5	2	6	2	6	2	3			
EPA 8141A	Disulfoton		5	2	6	2	6	2	3			
EPA 8141A	Demeton-s					1		2	3			
EPA 8141A	Malathion		5	2	6	2	6	2	3			
EPA 8141A	Methamidophos		5	2	6	2	6	2	3			
EPA 8141A	Methidathion		5	2	6	2	6	2	3			
EPA 8141A	Parathion, Methyl		5	2	6	2	6	2	3			
EPA 8141A	Phorate		5	2	6	2	6	2	3			
EPA 8141A	Phosmet		5	2	6	2	6	2	3			
Group A Pesticides												
EPA 8081A	Aldrin					1		2	3			
EPA 8081A	Chlordane					1		2	3			
EPA 8081A	Endosulfan I					1		2	3			
EPA 8081A	Endosulfan II					1		2	3			
EPA 8081A	HCH, alpha					1		2	3			
EPA 8081A	HCH, beta					1		2	3			
EPA 8081A	HCH, delta					1		2	3			
EPA 8081A	HCH, gamma					1		2	3			
EPA 8081A	Heptachlor					1		2	3			
EPA 8081A	Heptachlor epoxide					1		2	3			
EPA 8081A	Toxaphene					1		2	3			
Pyrethroids												

Method	Analyte	2004	2006	2007		2008			2009			
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm*	Irrigation	Fall*
EPA 8081A	Bifenthrin		5	2	6	1	6					
EPA 8081A	Cypermethrin	2	5	2	6	1	6					
EPA 8081A	Cyhalothrin, lambda	2	5	2	6	1	6					
EPA 8081A	Permethrin	2	5	2	6	1	6					
EPA 8081A	Cyfluthrin		5	2	6	1	6					
EPA 8081A	Esfenvalerate/Fenvalerate	2	5	2	6	1	6					
Triazines												
EPA 619	Atrazine		5	2	6	2	6	2	3			
EPA 619	Cyanazine		5	2	6	2	6	2	3			
EPA 8321A	Diuron		5	2	6	2	6	2	3			
EPA 547M	Glyphosate		5	2	6	2	6	2	3			
EPA 8321A	Linuron		5	2	6	2	6	2	3			
EPA 8141A	Molinate		5	2	6	1	6					
EPA 549.2M	Paraquat dichloride		5	2	6	2	6	2	3			
EPA 619	Simazine		5	2	6	2	6	2	3			
EPA 8141A	Thiobencarb		5	2	6	1	6					
EPA 8141A	Trifluralin					1		2	3			
Metals (Total)												
EPA 200.8	Arsenic					1	6	2	3			
EPA 200.8	Boron					1	6	2	3			
EPA 200.8	Cadmium					1	6	2	3			
EPA 200.8	Copper					1	6	2	3			
EPA 200.8	Lead					1	6	2	3			
EPA 200.8	Molybdenum					1		2	3			
EPA 200.8	Nickel					1	6	2	3			
EPA 200.8	Selenium					1	6	2	3			
EPA 200.8	Zinc					1	6	2	3			

Method	Analyte	2004	2006	2007		2008			2009			
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm*	Irrigation	Fall*
Metals (Dissolved)												
EPA 200.8	Cadmium					1		2	3			
EPA 200.8	Copper					1		2	3			
EPA 200.8	Lead					1		2	3			
EPA 200.8	Nickel					1		2	3			
EPA 200.8	Zinc					1		2	3			
Nutrients												
EPA 350.2	Ammonia as N					1	6	2	3			
SM 2340 C	Hardness as CaCO3					1	6	2	3			
EPA 300.0	Nitrate as N						6					
EPA 354.1	Nitrite as N						6					
EPA 353.2	Nitrate + Nitrite as N					1		2	3			
EPA 351.3	Nitrogen, Total Kjeldahl					1	6	2	3			
EPA 365.2	Orthophosphate as P					1	6	2	3			
EPA 365.2	Phosphate as P					1	6	2	3			
Toxicity												
EPA 821-02-012	Ceriodaphnia dubia	2	6	2	6	2	8	2	5		3	
EPA 821-02-012	Pimephales promelas	2	5	2	6	2	6	2	5			
EPA 821-02-013	Selenastrum capricornutum	2	5	3	6	2	8	2	5		2	
EPA 600/R-99-064	Hyalella azteca	2	1	1	1		1					

*Site not sampled in 2009 storm and fall seasons.

Table I-4. Duck Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos
Duck Creek @ Highway 4	25-Sep-07	A	X

Table I-5. Duck Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos
Duck Creek @ Drais Rd	5-May-08	U	X
Duck Creek @ Drais Rd	15-Jul-08	U	X
Duck Creek @ Drais Rd	16-Sep-08	U	X

Table I-6. Duck Creek site subwatershed. 2009 Management Plan sampling schedule for chlorpyrifos, *C. dubia*, and *S. capricornutum*. "X" indicates the site, month and analyte sampled.

Site Name	Sample Date	<i>Ceriodaphnia dubia</i> Toxicity	<i>Selenastrum capricornutum</i> Toxicity	Chlorpyrifos
Duck Creek @ Hwy 4	14-Apr-09	X	X	X
Duck Creek @ Hwy 4	12-May-09		X	X
Duck Creek @ Hwy 4	9-Jun-09			X
Duck Creek @ Hwy 4	14-Jul-09	X		X
Duck Creek @ Hwy 4	11-Aug-09			X
Duck Creek @ Hwy 4	15-Sep-09	X		X

Exceedance History

Ambient water monitoring within the Duck Creek subwatershed was initiated in the 2004 irrigation sampling season at the site at Hwy 4. Water quality results from sampling the Duck Creek site subwatershed from 2006 through 2009 have resulted in exceedances of DO (25), pH (4), *E. coli* (6), chlorpyrifos (14), diazinon (1), malathion (1), and 9 instances of water column toxicity; 6 to *Ceriodaphnia dubia* and 3 to *Selenastrum capricornutum*. Samples from 2009 included exceedances of the WQTLs for DO (6), chlorpyrifos (3), and one instance of toxicity to *Ceriodaphnia dubia*.

All exceedances are listed in Table I-7 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table I-7 and is determined using the SJCDWQC Management Plan prioritization process flow chart (Figure 3). The only change to Duck Creek constituents under a management plan following the 2009 sampling year is the upgrade of *Ceriodaphnia dubia* water column toxicity from a priority level of E to a priority level of D due to the continued occurrence of chlorpyrifos exceedances in the same month *Ceriodaphnia dubia* water column toxicity is experienced.

Table I-7. All exceedances experienced in samples collected from locations within the Duck Creek site subwatershed between August 2004 and December 2009 (sorted by season and date). If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	<i>E. coli</i> , 235 MPN/100 mL	Chlorpyrifos, 0.015 µg/L	Diazinon, 0.1 µg/L	Malathion, 0 µg/L	<i>C. dubia</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count
Duck Creek @ Hwy 4	Irrigation	5/16/2006	5.6		2400	0.029				
Duck Creek @ Hwy 4	Irrigation	6/20/2006	4.5		330					
Duck Creek @ Hwy 4	Irrigation	7/18/2006	5.5							
Duck Creek @ Hwy 4	Irrigation	8/15/2006		6.43						
Duck Creek @ Hwy 4	Irrigation	9/19/2006				0.15			0	
Duck Creek @ Hwy 4	Storm	2/11/2007			820					
Duck Creek @ Hwy 4	Storm	2/28/2007			2400		0.11			793000
Duck Creek @ Hwy 4	Storm	3/6/2007	5.8							
Duck Creek @ Hwy 4	Irrigation	4/10/2007			290					
Duck Creek @ Hwy 4	Irrigation	6/12/2007		8.66						
Duck Creek @ Hwy 4	Irrigation	7/10/2007	6.67			0.024				
Duck Creek @ Hwy 4	Irrigation	8/9/2007	6.54							

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	E. coli, 235 MPN/100 mL	Chlorpyrifos, 0.015 µg/L	Diazinon, 0.1 µg/L	Malathion, 0 µg/L	C. dubia, Survival (%)	S. capricornutum, Total Cell Count
Duck Creek @ Hwy 4	Irrigation	9/4/2007	6.99			0.025				
Duck Creek @ Hwy 4	Irrigation	9/25/2007	5.83			0.029				
Duck Creek @ Hwy 4	Storm	1/23/2008			240					
Duck Creek @ Hwy 4	Irrigation	4/15/2008				0.057			0	374263
Duck Creek @ Hwy 4	Irrigation	4/23/2008							0	
<i>Duck Creek @ Drais Rd</i>	<i>Irrigation</i>	<i>5/13/2008</i>	<i>6</i>	<i>6.05</i>		<i>0.42</i>				
Duck Creek @ Hwy 4	Irrigation	5/13/2008	6.95	6.31						191899
Duck Creek @ Hwy 4	Irrigation	6/10/2008	6.89			0.11		0.22		
<i>Duck Creek @ Drais Rd</i>	<i>Irrigation</i>	<i>7/15/2008</i>	<i>2.66</i>							
Duck Creek @ Hwy 4	Irrigation	7/15/2008	5.87			0.066			0	
Duck Creek @ Hwy 4	Irrigation	7/22/2008	4.92						0	
Duck Creek @ Hwy 4	Irrigation	8/12/2008	6			0.017				
Duck Creek @ Hwy 4	Irrigation	8/13/2008	5.34							
<i>Duck Creek @ Drais Rd</i>	<i>Irrigation</i>	<i>9/16/2008</i>	<i>3.99</i>							
Duck Creek @ Hwy 4	Irrigation	9/16/2008	5.92			0.027				
Duck Creek @ Hwy 4	Fall	11/4/2008	5.38							
Duck Creek @ Hwy 4	Winter	3/10/2009	5.4							
Duck Creek @ Hwy 4	Irrigation	5/12/2009	6.43							
Duck Creek @ Hwy 4	Irrigation	6/9/2009	6.74			0.07				
Duck Creek @ Hwy 4	Irrigation	7/14/2009	4.5			0.15			0	
Duck Creek @ Hwy 4	Irrigation	8/11/2009	4.6			0.031				
Duck Creek @ Hwy 4	Irrigation	9/15/2009	5.62							
Constituent Priority			E	E	E	A/B	A/B	NP	D	E

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.

2007 - 2009 Management Plan Monitoring Results

In 2007, 2008, and 2009, MPM took place in the Duck Creek site subwatershed for chlorpyrifos; *Ceriodaphnia* toxicity and *Selenastrum* toxicity were also added to 2009 MPM. Table I-8 provides monitoring results for all Management Plan constituents from all sampling events during the 2007, 2008, and 2009 irrigation seasons including MPM.

2007

Normal monitoring (April-September) and additional MPM (September) for chlorpyrifos occurred at Duck Creek @ Highway 4 in 2007 (Table I-8). An exceedance occurred during normal monitoring at Duck Creek @ Hwy 4 in July (0.024 µg/L) and two exceedances of chlorpyrifos were detected in September for both normal monitoring (0.025 µg/L) and MPM (0.029 µg/L).

2008

Normal monitoring (April-September) at Duck Creek @ Hwy 4 and upstream monitoring at Duck Creek @ Drais Rd for chlorpyrifos (May, July, and September) occurred in 2008. There were exceedances in every month except May during normal monitoring. Management Plan Monitoring resulted in one exceedance in May of 0.420µg/L (Table I-8).

2009

Normal monitoring only was conducted at Duck Creek during January, February, and March of 2009 and resulted in no exceedances of the chlorpyrifos WQTL. Management Plan Monitoring was conducted during the 2009 irrigation season for chlorpyrifos (April – September), *Ceriodaphnia* toxicity (April, July, and September) and *Selenastrum* toxicity (April and May). Exceedances of the chlorpyrifos WQTL were experienced in June (0.070 µg/L), July (0.150 µg/L) and August (0.031 µg/L, Table I-8). Toxicity to *Ceriodaphnia* occurred in samples collected in July.

Management Plan Monitoring for diazinon and *Selenastrum* toxicity took place in February of 2010 and results will be reported in the 2011 Management Plan Update Report.

Management Plan Monitoring will occur for chlorpyrifos and toxicity to *Ceriodaphnia* and *Selenastrum* during the 2010 irrigation season. Management Plan Monitoring for diazinon will occur again in February 2011.

Table I-8. Duck Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007), 'US' indicates upstream MPM (2008) for chlorpyrifos, and chlorpyrifos, *Ceriodaphnia dubia* toxicity and *Selenastrum capricornutum* toxicity for the 2009 irrigation seasons. Exceedance values are in bold.

Month:		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
2007 NM (@ Hwy 4)	Date	NA	NA	NA	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	<0.003	0.024	<0.003	0.025
2007 MPM A (@ Hwy 4)	Date	NA	NA	NA	NA	NA	NA	NA	NA	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	0.029
2008 NM (@ Hwy 4)	Date	NA	NA	NA	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	NA	NA	NA	0.057	<0.003	0.110	0.066	0.017	0.027
2008 MPM US (@ Drais Rd)	Date	NA	NA	NA	NA	5/13/08	NA	7/15/08	NA	9/16/08
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	0.420	NA	<0.003	NA	<0.003
2009 NM (@ Hwy 4)	Date	1/13/09	2/10/09	3/10/09	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	NA	NA	NA	NA	NA	NA
2009 MPM (@ Hwy 4)	Date	NA	NA	NA	4/14/09	5/12/09	6/09/09	7/14/09	8/11/09	9/15/09
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	0.011	0.070	0.150	0.031	<0.003
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	100	NA	NA	0	NA	100
	<i>S. capricornutum</i> toxicity (% Control)	NA	NA	NA	516	498	NA	NA	NA	NA

NA - Not applicable; this site was not sampled during this month for particular constituent.

Load Calculations

Loads have been calculated for the chlorpyrifos detections based on the following formula (Table I-9):

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L} \times \text{Concentration (milligram/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table I-9. Duck Creek site subwatershed. Instantaneous load calculations for chlorpyrifos and diazinon where discharge was measured (sorted by analyte, site and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration $\mu\text{g/L}$	Loading Rate $\mu\text{g/sec}$
Duck Creek @ Hwy 4	Chlorpyrifos	16-May-06	12.68	0.029	10.41
Duck Creek @ Hwy 4	Chlorpyrifos	19-Sep-06	6.02	0.15	25.57
Duck Creek @ Hwy 4	Chlorpyrifos	10-Jul-07	14.43	0.024	9.81
Duck Creek @ Hwy 4	Chlorpyrifos	4-Sep-07	0	0.025	0
Duck Creek @ Hwy 4	Chlorpyrifos	25-Sep-07	2.16	0.029	1.77
Duck Creek @ Hwy 4	Chlorpyrifos	23-Jan-08	2.11	0.0081	0.48
Duck Creek @ Hwy 4	Chlorpyrifos	15-Apr-08	13.07	0.057	21.10
Duck Creek @ Hwy 4	Chlorpyrifos	10-Jun-08	15.51	0.11	48.31
Duck Creek @ Hwy 4	Chlorpyrifos	15-Jul-08	13.67	0.066	25.55
Duck Creek @ Hwy 4	Chlorpyrifos	12-Aug-08	4.97	0.017	2.39
Duck Creek @ Hwy 4	Chlorpyrifos	16-Sep-08	20.8	0.027	15.90
Duck Creek @ Hwy 4	Chlorpyrifos	13-Jan-09	0	0.005	0
Duck Creek @ Hwy 4*	Chlorpyrifos	13-Jan-09	0	0.0048	0
Duck Creek @ Hwy 4	Chlorpyrifos	10-Feb-09	0	0.0037	0
Duck Creek @ Hwy 4	Chlorpyrifos	12-May-09	5.57	0.011	1.73
Duck Creek @ Hwy 4	Chlorpyrifos	9-Jun-09	11.54	0.07	22.87
Duck Creek @ Hwy 4	Chlorpyrifos	14-Jul-09	23.44	0.15	99.56
Duck Creek @ Hwy 4	Diazinon	11-Feb-07	0	0.055	0
Duck Creek @ Hwy 4	Diazinon	28-Feb-07	45.83	0.11	142.75
Duck Creek @ Hwy 4	Diazinon	23-Jan-08	2.11	0.018	1.08
Duck Creek @ Hwy 4	Diazinon	13-Jan-09	0	0.012	0

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos and diazinon are the only priority A/B constituents included in the Management Plan within the Duck Creek @ Hwy 4 site subwatershed. There has only been one exceedance of the diazinon WQTL (February 2007) and sources of this exceedance were discussed in the June 30, 2008 SAMR. There have been no detections of diazinon in samples collected in the storm monitoring months of 2008 or 2009.

Chlorpyrifos

Fourteen exceedances of the chlorpyrifos WQTL (0.015 µg/L) occurred throughout the irrigation season in samples collected between 2004 and 2009 during normal and MPM (Table I-7). The Coalition used a combination of monitoring data and evaluation of Pesticide Use Report (PUR) data to identify possible sources.

PUR data are reviewed for the number of applications and amount of the active ingredient (AI) applied (pounds applied), and acres treated (Table I-10, Figure I-2). The greatest chlorpyrifos use occurred in 2006 (72,187 lbs) while the lowest use occurred in 2009 (2,810 lbs, Table I-10, Figure I-2). The amount of chlorpyrifos applied in this subwatershed in 2009 decreased by more than fifty percent compared to the applications in 2006. The number of applications and acres treated was also significantly less than the 2006 levels (Table I-10, Figure I-2). Peak use of chlorpyrifos consistently occurs during the month of May in the subwatershed (Table I-10, Figure I-2). Exceedances do not always occur during months of the greatest amount of use (Figure I-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos. The highest amounts applied were associated with walnuts (18,288 lbs) followed by alfalfa (1,793 lbs) and corn (1,439 lbs) (Table I-11). The Coalition has focused its outreach to target growers farming these crops.

Table I-10. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for 2006 - 2009 in the Duck Creek @ Hwy 4 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
March, 2006	1	18.6	40
April, 2006	2	38.5	50
May, 2006	28	2462.3	1696
June, 2006	12	1342.1	876.5
July, 2006	18	1942.9	1534
August, 2006	20	1170.7	1015
September, 2006	3	127.2	268
October, 2006	1	114.1	57

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
March, 2007	11	603.4	537
April, 2007	9	362.3	548
May, 2007	12	1211.3	803
June, 2007	2	156.8	78
July, 2007	7	429.5	572
August, 2007	3	70.2	80
October, 2007	1	42.5	42.5
March, 2008	13	756.5	642
April, 2008	10	433.0	440
May, 2008	13	1393.7	732
June, 2008	1	24.0	24
July, 2008	16	1180.0	887
August, 2008	2	114.0	57
February, 2009	1	1.6	46.8
March, 2009	13	472.2	578
April, 2009	2	23.0	23
May, 2009	12	1007.3	941
June, 2009	2	67.8	33.9
July, 2009	6	689.5	346
August, 2009	1	22.5	12
November, 2009	4	525.8	280
Summaries by Year			
2006 Total	85	7216.6	5536.5
2007 Total	45	2876.1	2660.5
2008 Total	55	3901.4	2782
2009 Total	41	2809.8	2260.7
Total	226	16,803.8	13,239.7

Figure I-2. Pounds of chlorpyrifos applied within the Duck Creek @ Hwy 4 site subwatershed by month for 2006 - 2009. Asterisk (*) denotes months with exceedances.

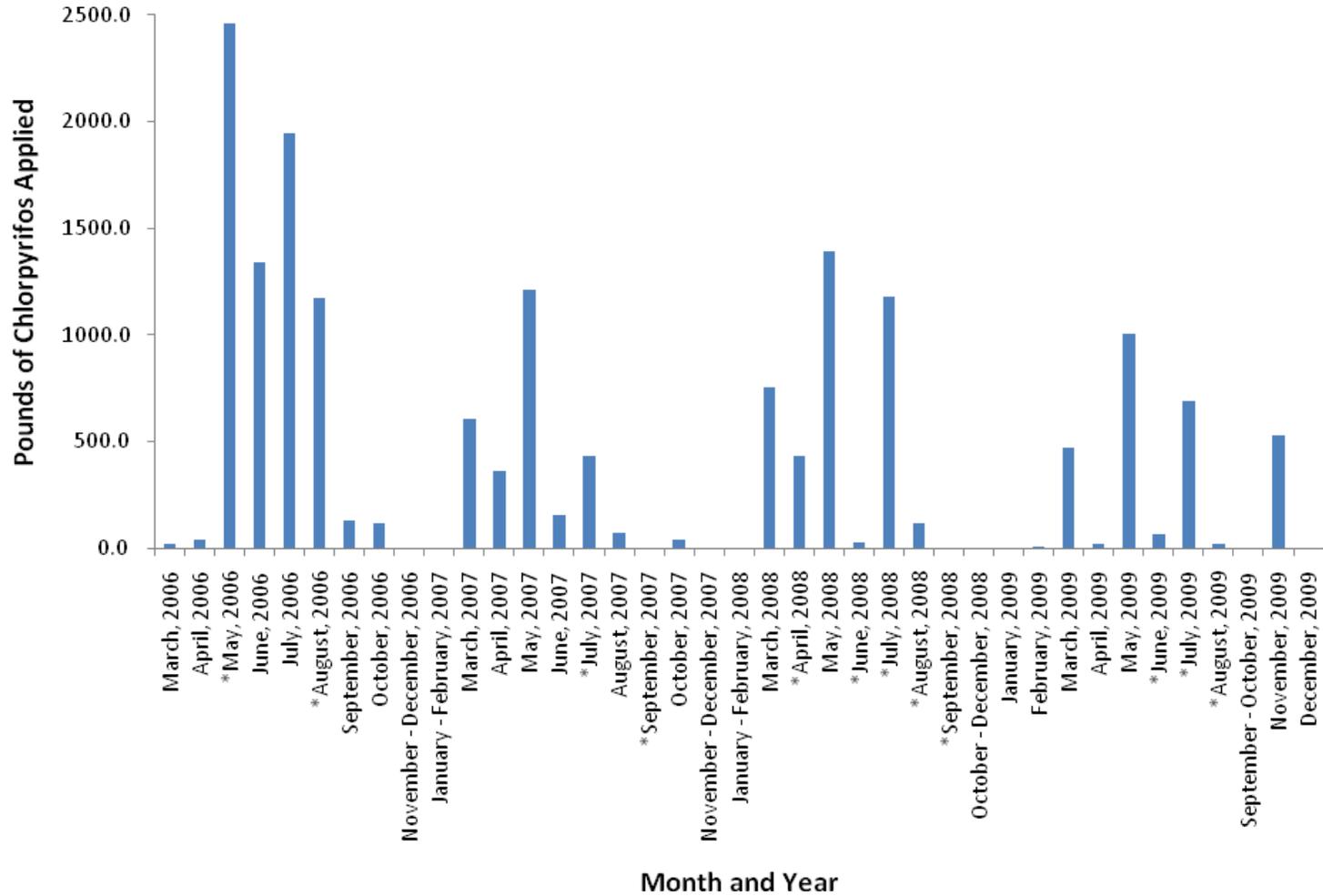


Table I-11. Total pounds active ingredient (AI) for chlorpyrifos based on PUR data from 2006-2009 within the Duck Creek @ Hwy 4 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA	LOCK-ON INSECTICIDE	167.740
		LORSBAN 4E-HF	136.582
		LORSBAN-4E	142.494
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	1128.802
		LORSBAN 4E-HF	113.650
		LORSBAN-4E	104.008
	APPLE	LORSBAN 4E-HF	51.481
		LORSBAN ADVANCED	137.094
		LORSBAN-4E	581.659
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	967.804
	CORN FOR/FOD	GOVERN 4E INSECTICIDE	72.720
		LORSBAN 15G GRANULAR INSECTICIDE	313.809
		NUFOS 15G	85.050
	GRAPE, WINE	LORSBAN ADVANCED	525.840
	N-OUTDR CONTAINER/FLD GRWN PLANTS	DURSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	104.500
		ESTATE INSECTICIDE	18.628
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	LORSBAN 15G GRANULAR INSECTICIDE	80.400
	ONION DRY ETC	LORSBAN 15G GRANULAR INSECTICIDE	1.623
	WALNUT	GOVERN 4E INSECTICIDE	703.990
		LORSBAN 4E INSECTICIDE	180.018
		LORSBAN ADVANCED	206.580
		LORSBAN-4E	2624.217
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DURSBAN 4E-N	114.057
GOVERN 4E INSECTICIDE		2616.490	
LORSBAN 4E INSECTICIDE		940.453	
LORSBAN 4E-HF		588.984	
LORSBAN-4E		10217.518	
NUFOS 4E		95.576	
ALFALFA – Total Pounds Chlorpyrifos Applied			1793.276
APPLE – Total Pounds Chlorpyrifos Applied			770.234
CORN – Total Pounds Chlorpyrifos Applied			1439.383
GRAPES – Total Pounds Chlorpyrifos Applied			525.840
N-OUTDOOR PLANTS – Total Pounds Chlorpyrifos Applied			123.128
ONION – Total Pounds Chlorpyrifos Applied			82.023
WALNUT – Total Pounds Chlorpyrifos Applied			18287.883
Total pounds chlorpyrifos applied (2006 - 2009)			23,021.766

Previous analyses conducted by the Coalition and reported in the 2009 Management Plan Update suggest that the chlorpyrifos concentration in the Duck Creek waterway increases as both the application rate and the total pounds applied increase. These results indicate that management of chlorpyrifos in this watershed should focus on providing information on a watershed basis to growers to review their operation and determine if irrigation return flows are managed properly, specifically to growers with the potential to drain to the creek. Alfalfa and walnut growers should be targeted for outreach especially prior to the irrigation season. Previous investigations revealed that TRS' with exceedances are located adjacent to the creek suggesting that drift from aerial applications could play a major role in generating the exceedances and should be one of the subjects of focused outreach. Although approximately 16% of the member acreage utilize a sediment settling ditch and approximately 14% of the member acreage utilize recirculation and/or tail water return systems, the Coalition anticipates that targeted outreach will increase the use of these practices and other irrigation water management practices within Duck Creek (see the SJCDWQC General Survey Summary Report submitted on December 30, 2008 for details on the management practices within this subwatershed).

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition focused outreach to growers who had used chlorpyrifos within the last two years and contacted grower permittees associated with the targeted growers. Beginning in the fall of 2008, the Coalition made several individual contacts with permittees and/or growers to discuss the Duck Creek Management Plan strategy and relevant management practices. The Coalition also hosted a subwatershed grower meeting in November 2008 and invited members to a Mid Valley Agricultural Services hosted grower meeting in March 2009 to further expand their grower audience as well as highlight chlorpyrifos management practices. Although the meeting focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including diazinon exceedances, *Ceriodaphnia dubia* and *Selenastrum capricornutum* toxicity, and exceedances of *E. coli*, pH, and DO. Surveys were completed that document members' current practices and indicate which recommended practices growers anticipated implementing in the upcoming year. The Coalition is in the process of compiling and assessing the surveys.

The Coalition contacted 32 permittees whom are associated with 36 different farming operations. This accounts for 15,619 acres within the subwatershed. To date, the Coalition has received surveys for all targeted members and thus has achieved 100% of targeted grower contact.

The Coalition will contact members in the fall of 2010 through the winter of 2011 to determine what additional management practices were implemented in 2010 and if additional practices are planned for 2011. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year. Not all growers will need to be contacted during the second fall. To obtain the information on practices implemented since the interview/meeting, the Coalition anticipates

either conducting phone calls or sending out a brief letter that includes a survey for the grower to complete.

To evaluate the implementation of new management practices, the Coalition will monitor at Duck Creek @ Hwy 4 during 2010. Depending on when additional management practices are implemented, the Coalition may monitor through 2011 to evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or have the potential for spray drift will affect downstream water quality by the end of the second year as a high priority site subwatershed.

Diazinon

The concentration of diazinon in a sample exceeded the WQTL (0.1 µg/L) during storm monitoring in February 2007. This is the only exceedance of diazinon in this subwatershed. The Coalition conducted MPM during February 2010 for diazinon and will report this in the 2011 Management Plan Update.

The largest amount of diazinon was applied in 2007 (608 lbs) while the lowest amount was applied in 2009 (24 lbs) (Table I-12, Figure I-3). The amount of diazinon applied in this subwatershed in 2009 has decreased by more than fifty percent compared to 2006. The number of applications and acres treated is also significantly less than the 2006 levels (Table I-12, Figure I-3).

The largest applications were associated with cherries (1,560 lbs, Table I-13). The Coalition has focused its outreach to target growers farming these crops, specifically prior to winter dormant sprays. Recent conversations with growers have indicated that many growers are moving away from the practice of dormant sprays. Reported diazinon use in 2009 may be indicative of this as use only occurred in June.

Table I-12. Number of diazinon applications, total pounds applied, and total acres treated by month for 2006 - 2009 in the Duck Creek @ Hwy 4 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Diazinon Applications	Pounds Applied	Acres Treated
February, 2006	4	38.5	48
April, 2006	1	130.0	130
October, 2006	1	5.0	10
January, 2007	3	265.5	142
February, 2007	3	99.9	217
March, 2007	2	146.0	138
July, 2007	1	73.5	49
November, 2007	1	23.0	46
February, 2008	2	273.0	156

Month/Year	Number of Diazinon Applications	Pounds Applied	Acres Treated
March, 2008	2	22.5	45
April, 2008	2	260.0	260
August, 2008	1	2.1	231
June, 2009	1	24.3	48.5
Summaries by Year			
2006 Total	6	173.5	188
2007 Total	10	607.9	592
2008 Total	7	557.6	692
2009 Total	1	24.3	48.5
Total	24	1,363.2	1,520.5

Figure I-3. Pounds of diazinon applied within the Duck Creek @ Hwy 4 site subwatershed by month for 2006 - 2009. Asterisk (*) denotes months with exceedances.

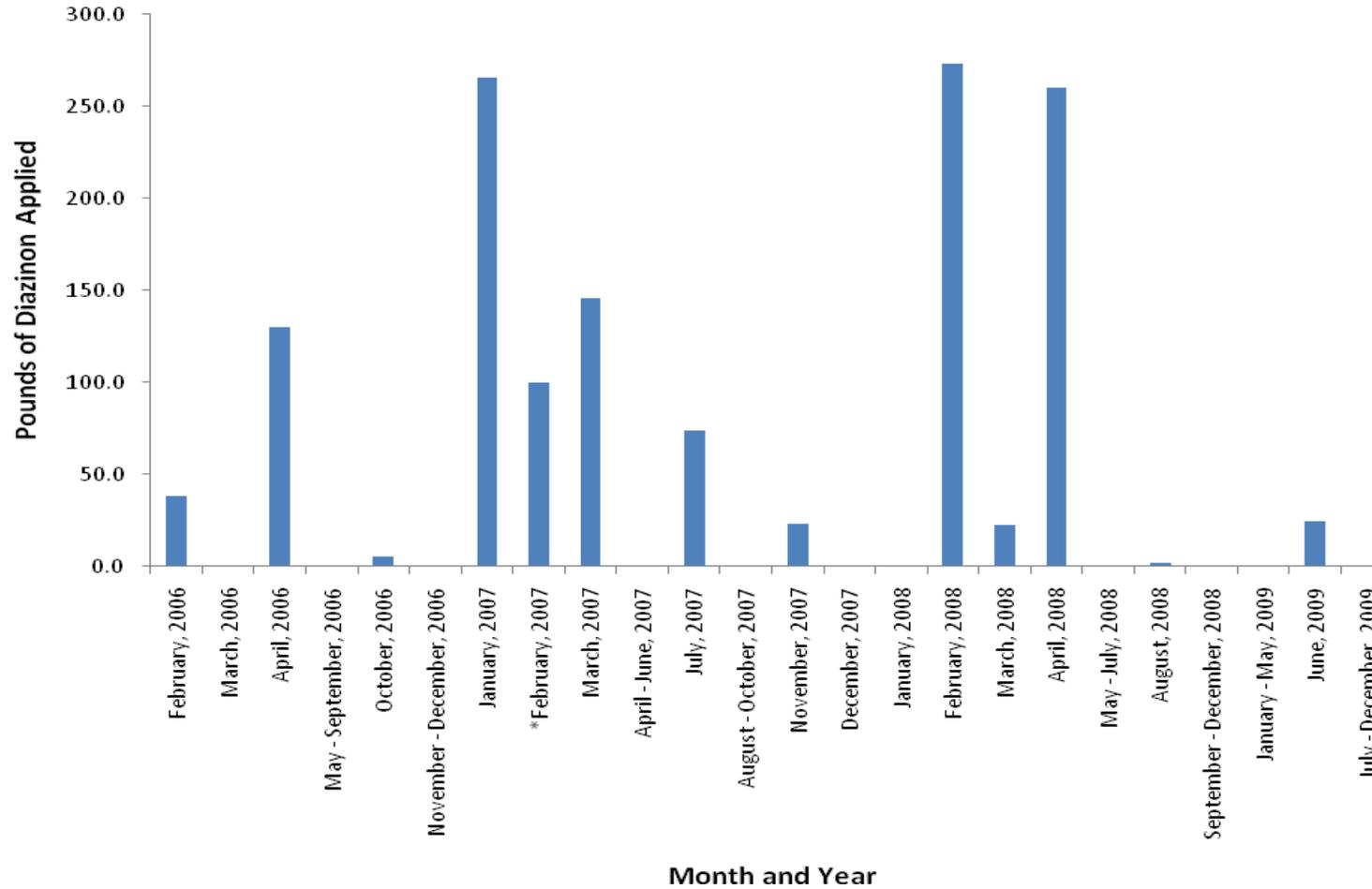


Table I-13. Total pounds active ingredient (AI) for diazinon based on PUR data from 2006-2009 within the Duck Creek @ Hwy 4 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIAZINON	CHERRY	DIAZINON 50W	1559.750
	N-OUTDR CONTAINER/FLD GRWN PLANTS	DIAZINON 4E	20.810
		DIAZOL 50 W	58.500
		DIAZOL AG 500	2.084
		DREXEL D-264 EC500 INSECTICIDE	5.004
		GOWAN DIAZINON 4E	44.982
	N-OUTDR PLANTS	DIAZOL 50 W	12.500
		DREXEL D-264 EC500 INSECTICIDE	92.870
	CHERRY – Total Pounds Diazinon Applied		
N-OUTDOOR PLANTS – Total Pounds Diazinon Applied			236.750
Total pounds diazinon applied (2006 - 2009)			1,796.500

The Coalition’s strategy for addressing diazinon exceedances in the Duck Creek subwatershed involved contacting specific growers with the potential to drain to the creek. Individual contacts that occurred within this subwatershed are described under the chlorpyrifos outreach section above and included discussions of management practices relevant to storm water retention.

Priority D Constituents

Ceriodaphnia toxicity

Ceriodaphnia is listed as a Priority C constituent. Toxicity to *Ceriodaphnia* occurred during 2009 MPM in July. Prior to this year, toxicity to *Ceriodaphnia* occurred twice during normal monitoring and in the corresponding resample in both April and July 2008 and once during normal monitoring in September 2006. All experiences of toxicity have coincided with chlorpyrifos exceedances. The Coalition believes that outreach targeted toward eliminating chlorpyrifos in the waterway will also reduce toxicity to *Ceriodaphnia*. Therefore, the Coalition will continue with outreach as explained above under the chlorpyrifos section to address the toxicity. The Coalition will also continue to monitor *Ceriodaphnia* toxicity as a part of the 2010 MPM schedule.

Priority E Constituents

Priority E constituents include DO, pH, and *E. coli*. Although these constituents will remain low priority, the Coalition will continue to collect these data and these constituents have been discussed during individual contacts and annual grower meetings.

Water column toxicity to *Selenastrum* is also a priority E constituent. There was no toxicity during 2009 MPM in April and May. Previously, algae toxicity occurred in both April and May of 2008, although none was accompanied by exceedances of WQTLs for herbicides or copper.

Because there were numerous samples from across the Coalition that were toxic to *Selenastrum* during the spring of 2008, the Coalition previously hypothesized that the increased amount of toxicity could be attributed to the very dry winter when little rainfall was available to move herbicides from the fields. Instead, early irrigation could have mobilized sufficient quantities of herbicides to cause toxicity although none resulted in exceedances of the herbicides WQTLs. The only other toxicity prior to 2008 was in February 2007. The lack of repeated toxicity, as well as no exceedances of herbicides or copper WQTLs within this subwatershed, leads the Coalition to believe that the dry winter of 2008 may be a reasonable explanation for the toxicity to *Selenastrum* experienced in early irrigation season 2008. Outreach for this constituent will be included as a part of general outreach that encourages management practices to improve overall watershed quality.

Evaluation

This subwatershed is one of the first three priority site subwatersheds within the SJCDWQC and therefore the Coalition has focused its resources on identifying the sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals.

The Coalition's strategy for the Duck Creek subwatershed has been to target a large portion of growers applying products containing or related to the highest level priority constituents (chlorpyrifos, diazinon, and *Ceriodaphnia* toxicity). Outreach includes grower notification, management practice education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practices and assess future planned implementations have been completed by 100% of targeted growers. The Coalition is now in the process of assessing these results and planning the final stages of outreach.

Acres treated and pounds of chlorpyrifos applied decreased since 2006, which may be a result of educating growers about alternative products. Additionally, usage has decreased in July and August, when the most exceedances occurred in previous years. Despite this, chlorpyrifos concentrations in samples exceeded the WQTL in June, July, and August of 2009. Management Plan Monitoring in 2010 will indicate if a change in management practices as a result of individual contacts has resulted in long-term improvements to downstream water quality.

II. LONE TREE CREEK @ JACK TONE RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos
- Diazinon

Priority C

- Copper
- Diuron

Priority D

- *Ceriodaphnia* water column toxicity
- *Selenastrum capricornutum* water column toxicity
- *Hyalella azteca* sediment toxicity
- *Pimephales promelas* water column toxicity

Priority E

- Ammonia
- Dissolved Oxygen
- *E. coli*
- pH
- Specific Conductivity
- Total Dissolved Solids

Description of Lone Tree Creek Site Subwatershed

Lone Tree Creek @ Jack Tone Rd (29,390 irrigated acres) – This site is upstream from the French Camp Slough @ Airport Way site. Lone Tree Creek drains a large portion of the southern SJCDWQC region and confluences downstream with Littlejohns Creek and eventually French Camp Slough, flowing through urban areas before emptying into the Delta. The main agricultural land use upstream consists of deciduous nuts, field crops, irrigated pasture and several dairies. Figure II-1 illustrates the land use within this site subwatershed area. Lone Tree Creek is a 20-mile long modified natural channel. This ephemeral stream carries natural runoff, agricultural supply and return flows to Littlejohns Creek during periods of high flow and irrigation. This site subwatershed includes upstream locations (Lone Tree Creek @ Brennan Rd and Lone Tree Creek @ Valley Home Rd) which were sampled in 2008 (Table II-5). Table II-1 contains the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

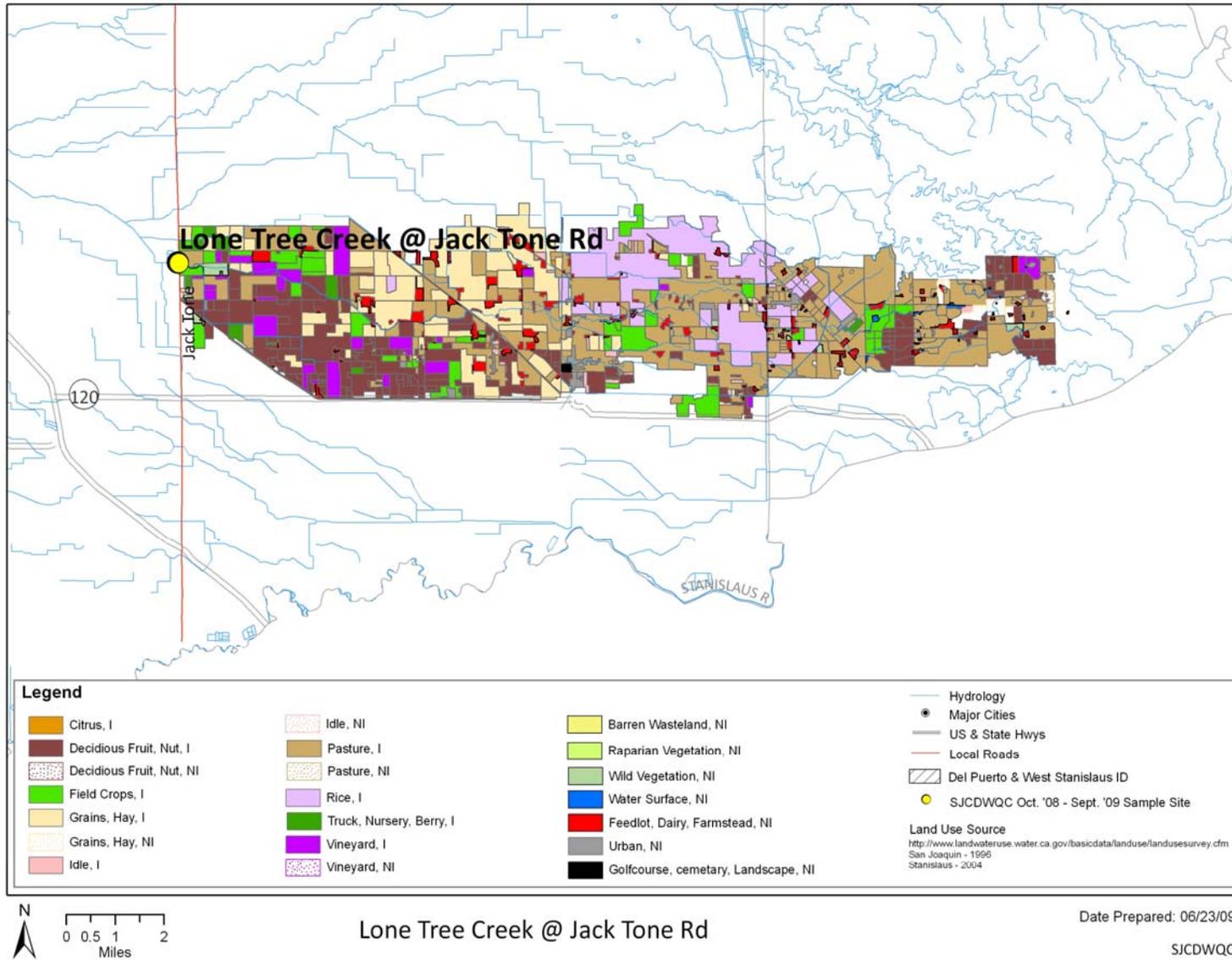
Table II-1. Coordinates of the Lone Tree Creek site subwatershed sampling locations.

Station Name	Station Code	Target Lat	Target Long
Lone Tree Creek @ Jack Tone Rd*	531XLTCLR	37.8376	-121.144
Lone Tree Creek @ Brennan Rd* ^u	535XLTABR	37.82552	-121.016
Lone Tree Creek @ Valley Home Rd ^u	535LTCVHR	37.82023	-120.902

*Original SJCDWQC sampling site

^uUpstream sites

Figure II-1. Site subwatershed map of land use for the Lone Tree Creek @ Jack Tone Rd sample site.



Subwatershed Monitoring History

Monitoring at Lone Tree Creek @ Jack Tone Rd began during the irrigation season of 2004 and continued through the storm and irrigation seasons of 2005-2007; storm and irrigation of 2008, and the winter and irrigation seasons of 2009 (Table II-2). Specific information on the analyses conducted across each of the monitoring seasons is provided below (Table II-3). The Lone Tree Creek site subwatershed is one of the rotating Assessment Monitoring locations within the SJCDWQC French Camp Slough @ Airport Way Zone. This subwatershed will not be rotated into the SJCDWQC monitoring program until 2015 (see SJCDWQC MRPP submitted on August 25, 2008 for details). However, the Coalition will continue to monitor for Management Plan constituents as outlined in this document.

Management Plan Monitoring for the Coalition was initiated during June of 2007 and included additional sampling at Lone Tree Creek @ Jack Tone Rd in July and August for chlorpyrifos (Table II-4). In 2008 Lone Tree Creek @ Brennan Rd and Lone Tree Creek @ Valley Home Rd were sampled as upstream monitoring locations. During irrigation seasons of 2009, MPM for *Selenastrum capricornutum* toxicity (April-May), chlorpyrifos (July-August) and copper (July-September) took place (Table II-6). A summary and discussion of exceedances at this site subwatershed are provided in the next section (Table II-7, and Table II-8).

Lone Tree Creek is currently listed under the proposed 2008 Central Valley Basin Plan 303d list of impaired water bodies for ammonia, biochemical (biological) oxygen demand, chlorpyrifos, diuron, *E. coli* sediment toxicity and unknown toxicity. The potential source of the stressors/pollutants is indicated as dairies for ammonia and biochemical oxygen demand. The potential source for chlorpyrifos, diuron and toxicity is agriculture while the source for *E. coli* is unknown. The exceedances were attributed to discharges from dairies.

Table II-2. Lone Tree Creek @ Jack Tone Rd sampling events per season and year.

	2004		2005		2006		2007		2008			2009		
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	2	2	5	2	5	2	6	1	6	NA	NA	NA	5	NA
Events Not Sampled	4	0	1	0	1	0	0	0	0	NA	NA	NA	1	NA
Total	2	2	5	2	5	2	6	1	6	NA	NA	NA	6	NA

NA - Not applicable. This site was not sampled during this season/year.

Table II-3. Number of analyses performed per analyte in each sampling season and year for the Lone Tree Creek @ Jack Tone Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2004	2005		2006		2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
Field and Physical Parameters															
NA	pH	2	3	5	4	5	3	9	3	9				5	
NA	Specific Conductivity	2	3	5	4	5	3	9	3	9				5	
NA	Dissolved Oxygen	2	3	4	3	4	3	9	3	9				5	
EPA 160.1	Dissolved Solids	2	2	5	2	5	2	6	1	6					
EPA 160.2	Suspended Solids														
EPA 180.1	Turbidity	2	2	5	2	5	2	7	1	6					
SM 9223 B	E. coli	2	2	5	2	6	2	7	1	6					
EPA 110.2	Color	2	2	5	2	5	2	7	1	6					
EPA 415.1	Total Organic Carbon	2	2	5	2	7	2	6	1	6					
EPA 405.1	Biological Oxygen Demand					2	2	2							
Carbamates															
EPA 8321A	Aldicarb					5	2	6	1	6					
EPA 8321A	Carbaryl					5	2	6	1	6					
EPA 8321A	Carbofuran					5	2	6	1	6					
EPA 8321A	Methiocarb					5	2	6	1	6					
EPA 8321A	Methomyl					5	2	6	1	6					
EPA 8321A	Oxamyl					5	2	6	1	6					
Organochlorines															
EPA 8081A	DDD					5	2	6	1	6					
EPA 8081A	DDE					5	2	6	1	6					
EPA 8081A	DDT					5	2	6	1	6					
EPA 8081A	Dicofol					5	2	6	1	6					
EPA 8081A	Dieldrin					5	2	6	1	6					

Method	Analyte	2004	2005		2006		2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 8081A	Endrin					5	2	6	1	6					
EPA 8081A	Methoxychlor					5	2	6	1	6					
Organophosphates															
EPA 8141A	Azinphos methyl					5	2	6	1	6					
EPA 8141A	Chlorpyrifos	2	2	5	2	5	2	8	1	6				2	
EPA 8141A	Diazinon	2	2	5	2	5	2	6	1	6					
EPA 8141A	Dimethoate					5	2	6	1	6					
EPA 8141A	Disulfoton					5	2	6	1	6					
EPA 8141A	Malathion					5	2	6	1	6					
EPA 8141A	Methamidophos					5	2	6	1	6					
EPA 8141A	Methidathion					5	2	6	1	6					
EPA 8141A	Parathion, Methyl					5	2	6	1	6					
EPA 8141A	Phorate					5	2	6	1	6					
EPA 8141A	Phosmet					5	2	6	1	6					
Pyrethroids															
EPA 8081A	Bifenthrin			1	2	5	2	6	1	6					
EPA 8081A	Cypermethrin	2	2	5	2	5	2	6	1	6					
EPA 8081A	Cyhalothrin, lambda	2	2	5	2	5	2	6	1	6					
EPA 8081A	Permethrin	2	2	5	2	5	2	6	1	6					
EPA 8081A	Cyfluthrin			1	2	5	2	6	1	6					
EPA 8081A	Esfenvalerate/ Fenvalerate	2	2	5	2	5	2	6	1	6					
Triazines															
EPA 619	Atrazine					5	2	6	1	6					
EPA 619	Cyanazine					5	2	6	1	6					
EPA 8321A	Diuron					5	2	6	1	6					
EPA 547M	Glyphosate					5	2	6	1	6					
EPA 8321A	Linuron					5	2	6	1	6					

Method	Analyte	2004		2005		2006		2007		2008			2009		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 8141A	Molinate					5	2	6	1	6					
EPA 549.2M	Paraquat dichloride					5	2	6	1	6					
EPA 619	Simazine					5	2	6	1	6					
EPA 8141A	Thiobencarb					5	2	6	1	6					
Metals (Total)															
EPA 200.8	Arsenic					6	2	6	1	6					
EPA 200.8	Boron					6	2	6	1	6					
EPA 200.8	Cadmium					6	2	6	1	6					
EPA 200.8	Copper					6	2	6	1	6				3	
EPA 200.8	Lead					6	2	6	1	6					
EPA 200.8	Nickel					6	2	6	1	6					
EPA 200.8	Selenium					6	2	2	1	6					
EPA 200.8	Zinc					6	2	6	1	6					
Metals (Dissolved)															
EPA 200.8	Cadmium														
EPA 200.8	Copper													3	
EPA 200.8	Lead														
EPA 200.8	Nickel														
EPA 200.8	Zinc														
Nutrients															
EPA 300.0	Nitrate as NO3					6	2	6	1	6					
EPA 353.2	Nitrate + Nitrite as N														
EPA 354.1	Nitrite as N					6	2	6	1	6					
EPA 350.2	Ammonia as N					6	2	6	1	6					
SM 2340 C	Hardness as CaCO3					6	2	6	1	6				3	
EPA 365.2	Phosphate as P					6	2	6	1	6					
EPA 365.2	Orthophosphate as P					6	2	6	1	6					

Method	Analyte	2004	2005		2006		2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 351.3	Nitrogen, Total Kjeldahl					6	2	6	1	6					
Toxicity															
EPA 821-02-012	Ceriodaphnia dubia	2	2	5	2	5	3	7	2	6					
EPA 821-02-012	Pimephales promelas	2	3	5	2	5	3	7	2	6					
EPA 821-02-013	Selenastrum capricornutum	2	3	5	3	5	4	7	2	8				2	
EPA 600/R-99-064	Hyaella azteca	2		3	1	1	1	1	1	1					

*Site not sampled during the 2008 fall and 2009 winter, storm and fall seasons.

Table II-4. Lone Tree Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos
Lone Tree Creek @ Jack Tone Rd	30-Jul-07	A	X
Lone Tree Creek @ Jack Tone Rd	28-Aug-07	A	X

Table II-5. Lone Tree Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule. "X" indicates the site, month and analyte sampled.

Station Name	Date	Type	Chlorpyrifos	Total Metals
Lone Tree Creek @ Valley Home Rd	13-May-08	U		X
Lone Tree Creek @ Valley Home Rd	10-Jun-08	U		X
Lone Tree Creek @ Valley Home Rd	15-Jul-08	U		X
Lone Tree Creek @ Brennan Rd	15-Jul-08	U	X	X
Lone Tree Creek @ Valley Home Rd	12-Aug-08	U		X
Lone Tree Creek @ Brennan Rd	12-Aug-08	U	X	X
Lone Tree Creek @ Valley Home Rd	16-Sep-08	U		X
Lone Tree Creek @ Brennan Rd	16-Sep-08	U		X

Table II-6. Lone Tree Creek site subwatershed. 2009 Management Plan sampling schedule for chlorpyrifos, copper and *Selenastrum capricornutum*. "X" indicates the site, month and analyte sampled.

Site Name	Sample Date	<i>Selenastrum capricornutum</i> Toxicity	Copper	Chlorpyrifos
Lone Tree Creek @ Jack Tone Rd	14-Apr-09	X		
Lone Tree Creek @ Jack Tone Rd	12-May-09	X		
Lone Tree Creek @ Jack Tone Rd	14-Jul-09		X	X
Lone Tree Creek @ Jack Tone Rd	11-Aug-09		X	X
Lone Tree Creek @ Jack Tone Rd	15-Sep-09		X	

Exceedance History

During monitoring at the Lone Tree Creek sites, exceedances of WQTLs occurred including; DO (25), pH (4), TDS (2), SC (1), ammonia (4), *E. coli* (29), chlorpyrifos (8), cypermethrin (1), DDT (1), DDE (1), simazine (1), thiobencarb (2), diazinon (2), diuron (3), lead (1), copper (8) (Tables II-7, and Table II-8). Water column toxicity occurred to *Ceriodaphnia* twice, *Pimephales* three times, and to *Selenastrum* ten times. Sediment samples were toxic to *Hyalella* twice (Table II-8).

Two DO exceedances and one chlorpyrifos exceedance occurred during the 2009 irrigation season.

All exceedances are listed in Tables II-7 and II-8 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. Using the SJCDWQC Management Plan prioritization process flow chart (Figure 3), priorities were assigned to management plan constituents. The priority level (A-E) assigned to each constituent is listed in the bottom row of Tables II-7 and II-8.

Table II-7. Field, bacteria, inorganic and legacy pesticide exceedances (low priority) experienced in samples collected from locations within the Lone Tree Creek site subwatershed between August 2004 and December 2009 (sorted by season and date). If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, 700 μ S/cm	Dissolved Solids, 450 mg/L	Ammonia, 1.5 mg/L	<i>E. coli</i> , 235 MPN/100 mL	DDE (p,p'), 0.00059 μ g/L	DDT (p,p'), 0.00059 μ g/L
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/24/2004	6.3					500		
Lone Tree Creek @ Jack Tone Rd	Storm	2/16/2005	6					1600		
Lone Tree Creek @ Jack Tone Rd	Storm	3/21/2005		8.58				900		
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/17/2005						900		
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/21/2005						500		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/19/2005	6.1					900		
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/16/2005	6.9					500		
Lone Tree Creek @ Brennan Rd	Irrigation	9/20/2005	5.1					1600		
Lone Tree Creek @ Jack Tone Rd	Irrigation	9/20/2005	4.5					1600		
Lone Tree Creek @ Brennan Rd	Storm	2/27/2006			1370	730		1600		
Lone Tree Creek @ Jack Tone Rd	Storm	2/27/2006		9				900		
Lone Tree Creek @ Brennan Rd	Storm	3/15/2006						1600		
Lone Tree Creek @ Jack Tone Rd	Storm	3/15/2006	6.3					1600		
Lone Tree Creek @ Brennan Rd	Storm	3/24/2006	3.3							
Lone Tree Creek @ Jack Tone Rd	Storm	3/24/2006	6.7							

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, 700 µS/cm	Dissolved Solids, 450 mg/L	Ammonia, 1.5 mg/L	E. coli, 235 MPN/100 mL	DDE (p,p'), 0.00059 µg/L	DDT (p,p'), 0.00059 µg/L
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/16/2006	6.7					2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/20/2006	4.7					2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/18/2006	5.6					770		
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/15/2006	6.62					920		
Lone Tree Creek @ Jack Tone Rd	Storm	2/11/2007	5.54				2.8	2400		
Lone Tree Creek @ Jack Tone Rd	Storm	2/28/2007					2.1	2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/22/2007						730		
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/12/2007						580		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/10/2007					2.5	2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/7/2007						1400	0.058	0.031
Lone Tree Creek @ Jack Tone Rd	Storm	1/23/2008	3.79			580	10	>2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	4/15/2008	5.85					650		
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Irrigation</i>	<i>5/13/2008</i>	<i>5.29</i>	<i>5.91</i>						
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/13/2008	4.65	6.1				1300		
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Irrigation</i>	<i>6/10/2008</i>	<i>6.62</i>							
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/10/2008						690		
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Irrigation</i>	<i>7/15/2008</i>	<i>6.07</i>							
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/15/2008						460		
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Irrigation</i>	<i>8/12/2008</i>	<i>6.66</i>							
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Irrigation</i>	<i>8/12/2008</i>	<i>4.2</i>							
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/12/2008						310		
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Irrigation</i>	<i>9/16/2008</i>	<i>5.93</i>							
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/14/2009	6.61							
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/11/2009	5.95							
Constituent Priority			E	E	E	E	E	E	NP	NP

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.

Table II-8. Metals, pesticides and toxicity (high priority) exceedances experienced in samples collected from locations within the Lone Tree Creek site subwatershed between August 2004 and December 2009 (sorted by season and date). If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Upstream sites are in italics.

Station Name	Season	Sample Date	Copper Total, µg/L	Lead Total, µg/L	Chlorpyrifos, 0.015 µg/L	Cypermethrin, 0.002 µg/L	Diazinon, 0.1 µg/L	Diuron ¹ , 2 µg/L	Thiobencarb ¹ , ND µg/L	Simazine ¹ , 4 µg/L	<i>C. dubia</i> , Survival (%)	<i>H. azteca</i> , Survival (%)	<i>P. promelas</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count
Lone Tree Creek @ Jack Tone Rd	Storm	2/16/2005											0	1380000
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/17/2005										93.8		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/19/2005			0.036	0.03								
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/16/2005			0.019									
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Storm</i>	<i>2/27/2006</i>			<i>0.018</i>						<i>0</i>		<i>0</i>	<i>1286750</i>
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Storm</i>	<i>3/15/2006</i>												<i>680250</i>
Lone Tree Creek @ Jack Tone Rd	Storm	3/15/2006												753750
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Storm</i>	<i>3/24/2006</i>												<i>1234500</i>
Lone Tree Creek @ Jack Tone Rd	Storm	4/27/2006										80		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/18/2006			0.019									
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/15/2006	8.9 (6.4)											
Lone Tree Creek @ Jack Tone Rd	Storm	2/11/2007	21 (12.4)	3.8 (3.6)	0.052		0.14	12						
Lone Tree Creek @ Jack Tone Rd	Storm	2/28/2007	19 (13.9)					4.3		4.1				353000
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/22/2007							0.5					
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/12/2007							0.12					
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/10/2007	12 (5.3)		0.035									
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/7/2007	4.6 (4.1)											
Lone Tree Creek @ Jack Tone Rd	Irrigation	9/4/2007	3.5 (3.1)											
Lone Tree Creek @ Jack Tone Rd	Storm	1/23/2008	40 (21.1)		1.7		0.2	4.9			0		75	742247

Station Name	Season	Sample Date	Copper Total, µg/L	Lead Total, µg/L	Chlorpyrifos, 0.015 µg/L	Cypermethrin, 0.002 µg/L	Diazinon, 0.1 µg/L	Diuron ¹ , 2 µg/L	Thiobencarb ¹ , ND µg/L	Simazine ¹ , 4 µg/L	C. dubia, Survival (%)	H. azteca, Survival (%)	P. promelas, Survival (%)	S. capricornutum, Total Cell Count
Lone Tree Creek @ Jack Tone Rd	Irrigation	4/15/2008												862738
Lone Tree Creek @ Jack Tone Rd	Irrigation	4/23/2008												1360982
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/13/2008												250516
Lone Tree Creek @ Valley Home Rd	Irrigation	7/15/2008	7 (6.5)											
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/11/2009			0.1									
Constituent Priority			C	NP	A/B	NP	A/B	C	NP²	NP	D	D	D	D

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.

NP² – Not Prioritized; thiobencarb is used only by rice and therefore all exceedances are turned over to the Rice Coalition.

2007 - 2009 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table II-9 for chlorpyrifos, and copper for years 2007-2009.

2007

In 2007, MPM was implemented at Lone Tree Creek @ Jack Tone Rd for chlorpyrifos (Table II-4). During the irrigation season of 2007 the Coalition did not conduct MPM for copper since only one exceedance occurred during the irrigation season. All *Selenastrum* and diuron exceedances occurred during the storm season. During 2007 the chlorpyrifos WQTL was only exceeded once during normal monitoring on July 10, 2007. Samples for copper exceeded the WQTL three times during 2007 normal monitoring.

2008

After experiencing copper exceedances the last three months of the 2007 irrigation season, 2008 upstream MPM included chlorpyrifos at only Lone Tree Creek @ Brennan Rd and metals at both Lone Tree Creek @ Valley Home Rd and Lone Tree Creek @ Brennan Rd (Table II-5). During the 2008 irrigation season the chlorpyrifos WQTL was not exceeded. Samples for copper exceeded the WQTL once in 2008 during upstream MPM at Lone Tree Creek @ Valley Home Rd on July 15, 2008.

2009

The Lone Tree Creek site subwatershed is one of the rotating Assessment Monitoring locations within the SJCDWQC French Camp Slough @ Airport Way Zone. This subwatershed will not be rotated into the SJCDWQC monitoring program until 2015. Therefore the Coalition conducted MPM during the 2009 irrigation season for the following constituents: copper (dissolved and total, July –September), chlorpyrifos (July, August), and *Selenastrum* toxicity (April and May, Table II-9). In addition, the Coalition collected samples from Lone Tree Creek @ Jack Tone Rd during the first and second storm monitoring events for *Selenastrum* toxicity, copper (dissolved and total), chlorpyrifos, diazinon and diuron. Of the samples collected from Lone Tree Creek @ Jack Tone Rd, there was an exceedance in chlorpyrifos in August 2009.

Management Plan Monitoring for copper, chlorpyrifos, diazinon, diuron, and *Selenastrum* toxicity took place in January, February, and/or March of 2010 and will be reported on in the 2011 Management Plan Update Report.

The Coalition plans to conduct MPM at Lone Tree Creek @ Jack Tone Rd during the 2010 irrigation season for copper, chlorpyrifos and *Selenastrum* toxicity. Management Plan Monitoring for January, February, and March of 2011 is planned for copper, chlorpyrifos, diazinon, diuron, and *Selenastrum* and *Hyalella* toxicity.

Table II-9. Lone Tree Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM for chlorpyrifos and copper (2007) and 'US' indicates upstream MPM for chlorpyrifos and copper (2008). MPM in 2009 included chlorpyrifos, copper, and *Selenastrum* toxicity. Exceedance values are in bold.

	Month	Apr	May	Jun	Jul	Aug	Sept
2007 NM (@ Jack Tone Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Chlorpyrifos (µg/L)	<0.003	<0.003	0.011	0.035	<0.003	<0.003
	Copper (µg/L)	3.4	4.8	5.1	12.0	4.6	3.5
2007 MPM A (@ Jack Tone Rd)	Date	NA	NA	NA	7/30/07	8/28/07	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	0.01	<0.003	NA
	Copper (µg/L)	NA	NA	NA	NA	NA	NA
2008 NM (@ Jack Tone Rd)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	Copper (µg/L)	3.5	4.5	3	3.6	3.5	2.2
2008 MPM US (@ Valley Home Rd)	Date	NA	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA
	Copper (µg/L)	NA	4.6	5.7	7.0	3.7	3.8
2008 MPM US (@ Brennan Rd)	Date	NA	NA	NA	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA
	Copper (µg/L)	NA	NA	NA	3.8	3.3	2.9
2009 MPM (@ Jack Tone Rd)	Date	4/14/09	5/12/09	NA	7/14/09	8/11/09	9/15/09
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	0.100	NA
	Copper, dissolved (µg/L)	NA	NA	NA	2.3	2.7	1.5
	Copper, total (µg/L)	NA	NA	NA	3.6	4.4	2.2
	<i>S. capricornutum</i> toxicity (% Control)	778	584	NA	NA	NA	NA

NA- Not applicable. This site was not sampled during this month for this constituent.

Load Calculations

Loads were calculated for the chlorpyrifos, copper, and diuron detections based on the following formula (Table II-10):

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (milligram/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

The load values presented for constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide a normalization of the concentrations by flow for various constituents at the time the samples were collected.

Table II-10. Lone Tree Creek site subwatershed. Instantaneous load calculations for chlorpyrifos, copper, diazinon, and diuron where discharge was measured (sorted by site, analyte and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Lone Tree Creek @ Brennan Rd	Chlorpyrifos	27-Feb-06	0	0.018	0
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	16-Feb-05	22.26	0.014	8.82
Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	16-Aug-05	25.85	0.019	13.91
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	16-Aug-05	25.85	0.019	13.91
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	27-Feb-06	0.34	0.014	0.13

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	15-Mar-06	27.84	0.013	10.25
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	11-Feb-07	26.7	0.052	39.32
Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	11-Feb-07	26.7	0.041	31.00
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12-Jun-07	39.21	0.011	12.21
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	10-Jul-07	35.9	0.035	35.58
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	30-Jul-07	26.77	0.01	7.58
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	23-Jan-08	18.88	1.7	908.86
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Copper</i>	<i>15-Jul-08</i>	<i>33.05</i>	<i>3.8</i>	<i>3556.33</i>
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Copper</i>	<i>12-Aug-08</i>	<i>12.43</i>	<i>3.3</i>	<i>1161.54</i>
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Copper</i>	<i>16-Sep-08</i>	<i>12.07</i>	<i>2.9</i>	<i>991.18</i>
Lone Tree Creek @ Jack Tone Rd	Copper	16-May-06	13.95	3.6	1422.08
Lone Tree Creek @ Jack Tone Rd	Copper	15-Aug-06	49.49	8.9	12472.53
Lone Tree Creek @ Jack Tone Rd*	Copper	11-Feb-07	26.7	21	15877.34
Lone Tree Creek @ Jack Tone Rd	Copper	11-Feb-07	26.7	21	15877.34
Lone Tree Creek @ Jack Tone Rd*	Copper	11-Feb-07	26.7	21	15877.34
Lone Tree Creek @ Jack Tone Rd	Copper	28-Feb-07	7.85	19	4223.48
Lone Tree Creek @ Jack Tone Rd	Copper	10-Apr-07	24.9	3.4	2397.32
Lone Tree Creek @ Jack Tone Rd	Copper	12-Jun-07	39.21	5.1	5662.58
Lone Tree Creek @ Jack Tone Rd	Copper	10-Jul-07	35.9	12	12198.96
Lone Tree Creek @ Jack Tone Rd	Copper	7-Aug-07	19.43	4.6	2530.92
Lone Tree Creek @ Jack Tone Rd	Copper	23-Jan-08	18.88	40	21385.00
Lone Tree Creek @ Jack Tone Rd	Copper	15-Jul-08	24.15	3.6	2461.88
Lone Tree Creek @ Jack Tone Rd	Copper	12-Aug-08	13.94	3.5	1381.59
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Copper</i>	<i>13-May-08</i>	<i>10.83</i>	<i>4.6</i>	<i>1410.70</i>
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Copper</i>	<i>10-Jun-08</i>	<i>7.94</i>	<i>5.7</i>	<i>1281.57</i>
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Copper</i>	<i>15-Jul-08</i>	<i>9.76</i>	<i>7</i>	<i>1934.62</i>
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Copper</i>	<i>12-Aug-08</i>	<i>12.89</i>	<i>3.7</i>	<i>1350.52</i>
<i>Lone Tree Creek @ Valley Home Rd</i>	<i>Copper</i>	<i>16-Sep-08</i>	<i>8.63</i>	<i>3.8</i>	<i>928.63</i>
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Diazinon</i>	<i>27-Feb-06</i>	<i>0</i>	<i>0.017</i>	<i>0</i>
<i>Lone Tree Creek @ Brennan Rd</i>	<i>Diazinon</i>	<i>15-Mar-06</i>	<i>12.09</i>	<i>0.031</i>	<i>10.61</i>
Lone Tree Creek @ Jack Tone Rd	Diazinon	16-Feb-05	22.26	0.089	56.10
Lone Tree Creek @ Jack Tone Rd	Diazinon	27-Feb-06	0.34	0.014	0.13
Lone Tree Creek @ Jack Tone Rd	Diazinon	15-Mar-06	27.84	0.023	18.13
Lone Tree Creek @ Jack Tone Rd	Diazinon	11-Feb-07	26.7	0.14	105.85
Lone Tree Creek @ Jack Tone Rd*	Diazinon	11-Feb-07	26.7	0.12	90.73
Lone Tree Creek @ Jack Tone Rd	Diazinon	23-Jan-08	18.88	0.2	106.92
Lone Tree Creek @ Jack Tone Rd	Diuron	11-Feb-07	26.7	12	9072.77
Lone Tree Creek @ Jack Tone Rd*	Diuron	11-Feb-07	26.7	5.1	3855.93
Lone Tree Creek @ Jack Tone Rd	Diuron	28-Feb-07	7.85	4.3	955.84
Lone Tree Creek @ Jack Tone Rd	Diuron	10-Apr-07	24.9	0.23	162.17

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	23-Jan-08	18.88	4.9	2,619.66

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos and diazinon are the only priority A/B constituents included in the Management Plan within the Lone Tree subwatershed.

Chlorpyrifos

Eight exceedances of the chlorpyrifos WQTL (0.015 µg/L) occurred throughout the irrigation and storm seasons in samples collected between 2004 and 2009 during normal and MPM (Table II-8).

PUR data are reviewed for the number of applications, the amount of the active ingredient (AI) applied (pounds applied), and acres treated (Table II-11, Figure II-2). The greatest amount of chlorpyrifos use occurred in 2005 (7,938 lbs) with the lowest use occurring in 2004 (374 lbs). The pounds of chlorpyrifos applied in this subwatershed have continuously decreased since 2005, and the 2009 applications are less than 20% of the 2005 applications. The number of applications and acres treated is also significantly less than 2005 levels (Table II-11, Figure II-2). Also important, the peak use of chlorpyrifos in the month of July decreased in 2009 compared to 2008 (Figure II-2). Despite this, the concentration of chlorpyrifos still exceeded the WQTL in the August 2009 MPM sample.

The Coalition also uses PUR data to assess which crops receive the most applications of chlorpyrifos (Table II-12). The highest application rates are associated with corn (10,873.158 lbs) followed by almonds (6,946.534 lbs, Table II-12). The most common product used within this subwatershed containing chlorpyrifos was Lorsban (Table II-12). The Coalition has focused its outreach to target growers farming these crops.

Table II-11. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for August 2004 through December 2009 in the Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
August, 2004	9	574.2	530
January, 2005	1	82.6	44
March, 2005	6	171.7	282
May, 2005	18	861.2	508
June, 2005	33	3379.7	1554.6
July, 2005	51	2256.3	1717
August, 2005	10	536.4	298

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
September, 2005	3	74.4	248
December, 2005	5	575.6	288.4
January, 2006	4	183.9	98
March, 2006	4	4.7	188
April, 2006	2	172.3	127
May, 2006	13	1394.6	800
June, 2006	35	2611.1	1894.1
July, 2006	35	1899.6	1382
August, 2006	7	256.7	138
September, 2006	4	256.5	253
October, 2006	3	297.6	152.4
November, 2006	2	249.0	134
January, 2007	5	447.3	240
March, 2007	1	8.1	40
April, 2007	2	24.2	110
May, 2007	24	1141.0	922
June, 2007	22	1526.8	1205
July, 2007	2	56.0	62
September, 2007	1	39.9	40
October, 2007	1	199.4	100
December, 2007	2	10.0	7.2
May, 2008	6	507.6	423
June, 2008	10	547.2	446
July, 2008	21	2040.0	804.3
October, 2008	1	16.5	8.25
January, 2009	1	4.0	10
March, 2009	2	326.3	138
April, 2009	1	70.0	35
June, 2009	1	91.4	45.7
July, 2009	5	506.8	258
August, 2009	1	60.6	35
October, 2009	4	351.2	186
Summaries by Year			
2004 Total	9	574.2	530
2005 Total	127	7937.9	4940
2006 Total	109	7326.1	5166.5
2007 Total	60	3452.7	2726.2
2008 Total	38	3111.3	1681.55
2009 Total	15	1410.3	707.7
Total	358	23,812.5	15,751.9

Figure II-2. Pounds of chlorpyrifos applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2009. Asterisk (*) denotes months with exceedances.

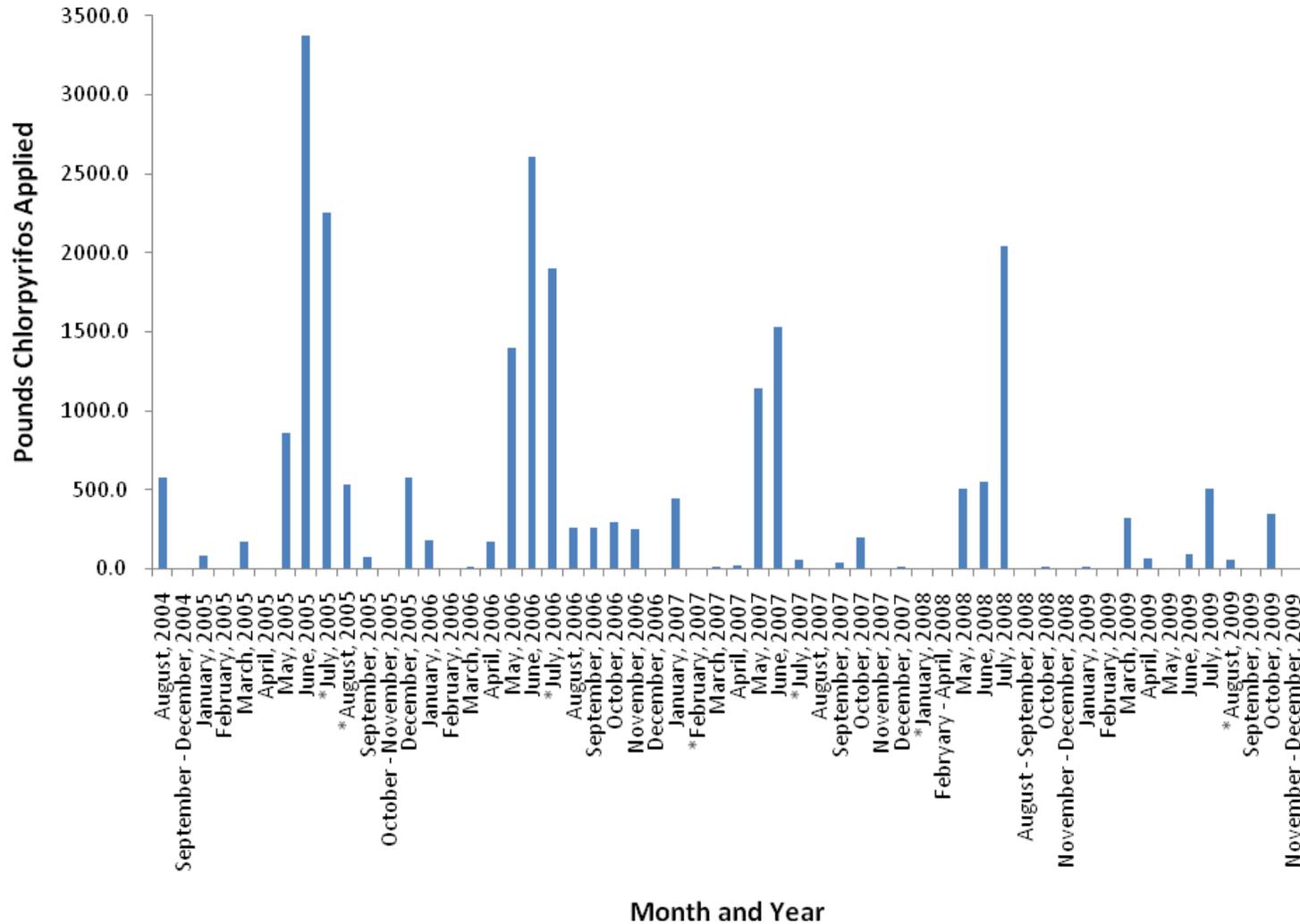


Table II-12. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2004-2009 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA	LORSBAN 4E-HF	251.225
		LORSBAN-4E	75.037
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	45.066
		LORSBAN 4E-HF	196.434
	ALMOND	CHLORPYRIFOS 4E AG	544.133
		GOVERN 4E INSECTICIDE	147.717
		LORSBAN 4E INSECTICIDE	514.361
		LORSBAN 4E-HF	925.019
		LORSBAN-4E	4752.683
		WARHAWK	62.620
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	5735.846
		LORSBAN 4E-HF	1140.852
		NUFOS 15G	1717.500
	CORN FOR/FOD	LORSBAN 15G GRANULAR INSECTICIDE	2076.450
		LORSBAN 4E-HF	48.010
		NUFOS 15G	154.500
	GRAPES, WINE	LORSBAN 4E-HF	860.746
		LORSBAN ADVANCED	351.186
		LORSBAN-4E	460.879
	NECTARINE	LORSBAN 4E INSECTICIDE	5.001
	PEACH	LORSBAN 4E INSECTICIDE	5.001
	WALNUT	GOVERN 4E INSECTICIDE	121.204
		LORSBAN 4E-HF	279.140
		LORSBAN-4E	259.980
		NUFOS 4E	26.440
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	26.231
		GOVERN 4E INSECTICIDE	202.007
		LORSBAN 4E INSECTICIDE	109.015
		LORSBAN 4E-HF	1604.057
		LORSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	1.000
LORSBAN-4E		1113.194	
ALFALFA – Total Pounds Chlorpyrifos Applied			667.764
ALMOND – Total Pounds Chlorpyrifos Applied			6946.534
CORN – Total Pounds Chlorpyrifos Applied			10873.158
GRAPES – Total Pounds Chlorpyrifos Applied			1672.810
NECTARINE – Total Pounds Chlorpyrifos Applied			5.001
PEACH – Total Pounds Chlorpyrifos Applied			5.001
WALNUT – Total Pounds Chlorpyrifos Applied			3742.269
Total pounds chlorpyrifos applied (2004 - 2009)			23,812.535

Previous analyses conducted by the Coalition and presented in the 2009 Management Plan Update suggest that outreach on the management of chlorpyrifos in this watershed should be a combination of providing information to growers across the entire watershed and focusing on specific parcels on an individual basis. The single exceedance in 2008 was associated with two applications in a single section suggesting that only one or two parcels were responsible. Additionally, the elevated concentration in the sample (1.7µg/L) suggests that surface runoff was the method of transport of chlorpyrifos to Lone Tree Creek. Almond and walnut growers and alfalfa and corn growers should be targeted for outreach. Although approximately 72% of grower acreage allow more than 36 hours between chlorpyrifos application and irrigation and a combined 32% of grower acreages utilize a recirculation and/or tail water return system or holding basin, 15% grower acreages employ no practices to lessen runoff. The Coalition feels widespread outreach can further encourage the use of irrigation and water management practices.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition focused outreach on growers who had used chlorpyrifos within the last two years and contacted grower permittees associated with the targeted growers. Beginning in the fall of 2008, the Coalition made several individual contacts with permittees and/or growers to discuss the Lone Tree Creek Management Plan strategy and relevant management practices. The Coalition also hosted a subwatershed grower meeting in November 2008 and invited members to a Mid Valley Agricultural Services hosted grower meeting in March 2009 to further expand their grower audience as well as highlight chlorpyrifos management practices immediately prior to the irrigation season. Individual contacts focused mainly on chlorpyrifos exceedances however all water quality results were reviewed and discussed including diazinon, copper and diuron exceedances, *Ceriodaphnia*, *Selenastrum*, *Pimephales* and *Hyalella* toxicity, and ammonia, *E. coli*, DO, SC, pH and TDS exceedances. Surveys were completed that document members' current practices and indicate which recommended practices growers anticipated implementing in the upcoming year. The Coalition is in the process of compiling and assessing the surveys.

The Coalition contacted 39 permittees whom are associated with 46 different farming operations. To date, the Coalition has received 35 surveys from targeted members and is in the process of reviewing and analyzing the data. The Coalition will follow up via a phone call and/or additional mailings with the remaining 11 targeted members to encourage them to complete the survey. This will be completed by October 2010.

The Coalition will contact members in the fall of 2010 through the winter of 2011 to determine which additional management practices were implemented in 2010 and if additional practices are planned for 2011. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year. Not all growers will need to be contacted during the second fall. To obtain the information on practices implemented since the interview/meeting, the Coalition anticipates

either conducting phone calls or sending out a brief letter that includes a survey for the grower to complete.

To evaluate the effectiveness of new management practices, the Coalition will monitor at Lone Tree Creek @ Jack Tone Rd during 2010. Depending on when additional management practices are implemented, the Coalition may monitor through 2011 to evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or are have the potential for spray drift will improve downstream water quality by the end of the second year.

Diazinon

The two exceedances that occurred in this watershed were both during storm monitoring on February 11, 2007 and January 23, 2008, making diazinon a new priority constituent as of 2008 sampling. The Coalition will monitor diazinon as a part of MPM in January and February 2010.

Applications of diazinon in this watershed typically occur as dormant sprays during December, January, and February with January receiving the most and largest applications; diazinon has also been applied in this watershed once in March 2007 and once in July 2008 (Table II-13, Figure II-3). However, 2009 PUR data shows that diazinon use, including number of applications, pounds applied, and acres treated, has significantly decreased in this subwatershed, in particular during the high use month of January (Table II-13, Figure II-3). Almonds remain the primary commodity receiving applications; other orchard crops also receive applications (Table II-14).

Table II-13. Number of diazinon applications, total pounds applied, and total acres treated by month for August 2004 through December 2009 in the Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Diazinon Applications	Pounds Applied	Acres Treated
December, 2004	6	37.8	22.25
January, 2005	21	1239.5	836
February, 2005	5	99.1	57.5
December, 2005	7	145.6	72.5
January, 2006	21	977.0	693
February, 2006	1	59.5	40
December, 2006	10	156.1	101.5
January, 2007	1	19.8	10
February, 2007	4	42.4	25
March, 2007	1	1.5	1
December, 2007	5	5.3	4.25
January, 2008	10	694.9	449
July, 2008	1	2.0	10
December, 2008	1	15.9	8
January, 2009	1	15.9	8
May, 2009	1	12.6	6.3
June, 2009	1	46.0	91.9

Summaries by Year			
2004 Total	6	37.8	22.25
2005 Total	33	1484.3	966
2006 Total	32	1192.6	834.5
2007 Total	11	69.0	40.25
2008 Total	12	712.7	467
2009 Total	3	74.4	106.2
Total	97	3,570.8	2,436.2

Figure II-3. Pounds of diazinon applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2009. Asterisk (*) denotes months with exceedances.

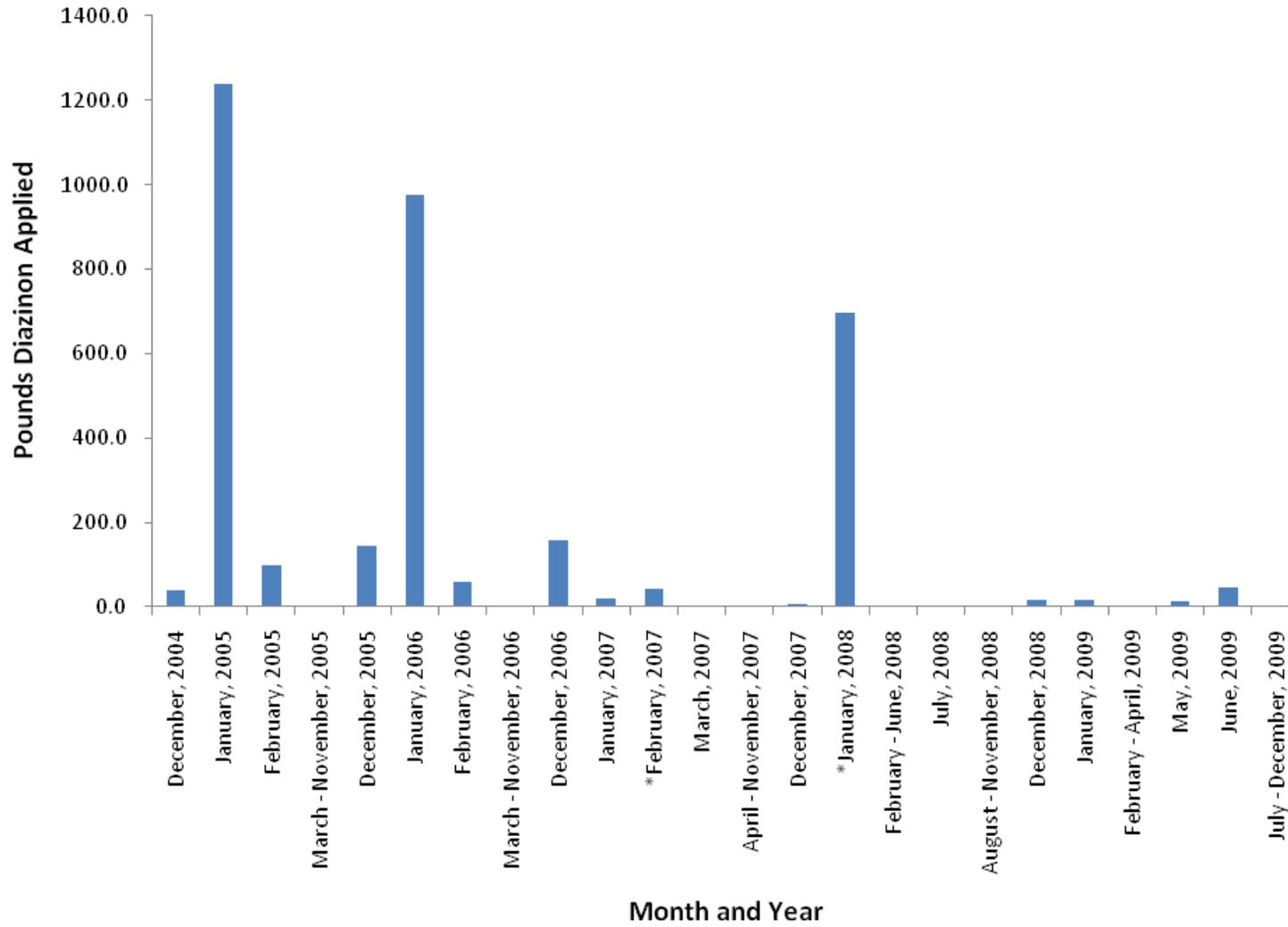


Table II-14. Total pounds active ingredient (AI) applied for diazinon based on PUR data from 2004 – 2009 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIAZINON	ALMOND	CLEAN CROP DIAZINON AG600 WBC	188.423
		DIAZINON 50W	5.000
		DIAZINON AG 500	1672.034
		DIAZOL 50 W	103.000
		DIAZOL AG 500	1192.269
		GOWAN DIAZINON 4E	235.906
	APPLE	D.Z.N. DIAZINON 50W (WITHDRAWN)	12.600
		DIAZOL 50 W	1.500
	APRICOT	DIAZOL 50 W	6.250
	CHERRY	DIAZINON 50W	45.950
		DIAZOL 50 W	5.125
	GRAPES	DIAZINON AG 500	19.844
	NECTARINE	DIAZOL 50 W	3.875
		DIAZOL AG 500	19.844
	PEACH	DIAZINON AG 500	31.750
		DIAZOL 50 W	4.875
		DIAZOL AG 500	9.922
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	DIAZOL 50 W	6.250
	WALNUT	PROKIL DIAZINON 4EC	6.400
	ALMOND – Total Pounds Diazinon Applied		
APPLE – Total Pounds Diazinon Applied			14.100
APRICOT – Total Pounds Diazinon Applied			6.250
CHERRY – Total Pounds Diazinon Applied			51.075
GRAPES – Total Pounds Diazinon Applied			19.844
NECTARINE – Total Pounds Diazinon Applied			23.719
PEACH – Total Pounds Diazinon Applied			46.548
PLUM (INCLUDES PRUNES) – Total Pounds Diazinon Applied			6.250
WALNUT – Total Pounds Diazinon Applied			6.400
Total pounds of diazinon applied (2004 - 2009)			3,570.818

Previous analyses presented by the Coalition in the 2009 Management Plan Update suggest that the diazinon in the exceedances originated from a small number of acres in the subwatershed. Management of diazinon in this watershed should focus on providing information to the growers to review their operation to determine if storm water discharges are managed properly, which coincides with the management plan strategy for chlorpyrifos. One exceedance in 2007 was slightly over the WQTL while the 2008 exceedance was double the

WQTL. It is difficult to determine if these concentrations are the result of storm water runoff or drift, or both. Almond and other orchard growers should be targeted for outreach especially prior to the dormant spray season. Individual contacts occurring within this subwatershed are described under the chlorpyrifos outreach section above and include discussions of diazinon exceedances as well as spray drift and storm runoff management practices.

Priority C Constituents

Copper

Copper exceedances have occurred eight times in this subwatershed. Copper is one of the most heavily applied constituents in the site subwatershed. There are fewer applications from the summer through the fall, with the bulk of the applications occurring in the winter and spring (Table II-15, Figure II-4). Since 2004, the number of copper applications, amount of copper applied (pounds AI), and the number of acres treated has decreased annually; pounds applied in 2009 (7,885 lbs) are significantly less than the pounds applied in 2008 (21,204 lbs, Table II-15, Figure II-4). Not all exceedances occur in months with the greatest use (Figure II-4).

The Coalition also used PUR data to assess which crops receive the most applications. Almonds, walnuts, and other orchard crops, and vineyards, receive the largest number of applications and the greatest pounds of copper (Table II-16). Rice by far receives the most applications of copper, but rice growers are not members of the Coalition.

Table II-15. Number of copper applications, total pounds applied, and total acres treated by month for August 2004 through December 2009 in the Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
September, 2004	1	24.6	16
October, 2004	1	39.3	16
December, 2004	14	1541.2	350.25
January, 2005	58	13853.5	2612.25
February, 2005	47	3403.9	1352.5
March, 2005	22	1067.6	563
April, 2005	40	5211.3	1361.6
May, 2005	29	8815.5	1051
June, 2005	2	469.7	105
December, 2005	19	3062.7	612.5
January, 2006	83	14605.8	3122
February, 2006	28	895.5	608.5
March, 2006	30	1216.2	1006.5
April, 2006	32	3103.7	1202.6
May, 2006	22	7863.4	1062.5
June, 2006	6	2029.5	205
August, 2006	1	32.3	9
September, 2006	1	53.9	35
October, 2006	2	100.1	65

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
December, 2006	19	1290.5	282.5
January, 2007	56	9196.5	2229
February, 2007	21	1165.7	640
March, 2007	11	1635.0	401
April, 2007	36	3912.9	1039
May, 2007	15	8541.7	869
June, 2007	1	366.3	37
November, 2007	2	98.7	25
December, 2007	10	268.5	49.45
January, 2008	44	7857.7	1918.75
February, 2008	21	1755.3	630.25
March, 2008	9	458.4	199
April, 2008	13	986.8	332.4
May, 2008	14	8122.2	703
September, 2008	2	159.9	42
December, 2008	6	1863.4	372
January, 2009	23	4188.6	946
February, 2009	11	795.0	538.2
March, 2009	3	482.4	137
April, 2009	14	1337.4	511.7
May, 2009	2	126.4	44
December, 2009	3	955.3	201.9
Summaries by Year			
2004 Total	16	1605.2	382.25
2005 Total	217	35884.2	7657.85
2006 Total	224	31190.9	7598.6
2007 Total	152	25185.3	5289.45
2008 Total	109	21203.7	4197.4
2009 Total	56	7885.2	2378.8
Total	774	122,954.5	27,504.35

Figure II-4. Pounds of copper applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2009. Asterisk (*) denotes months with exceedances.

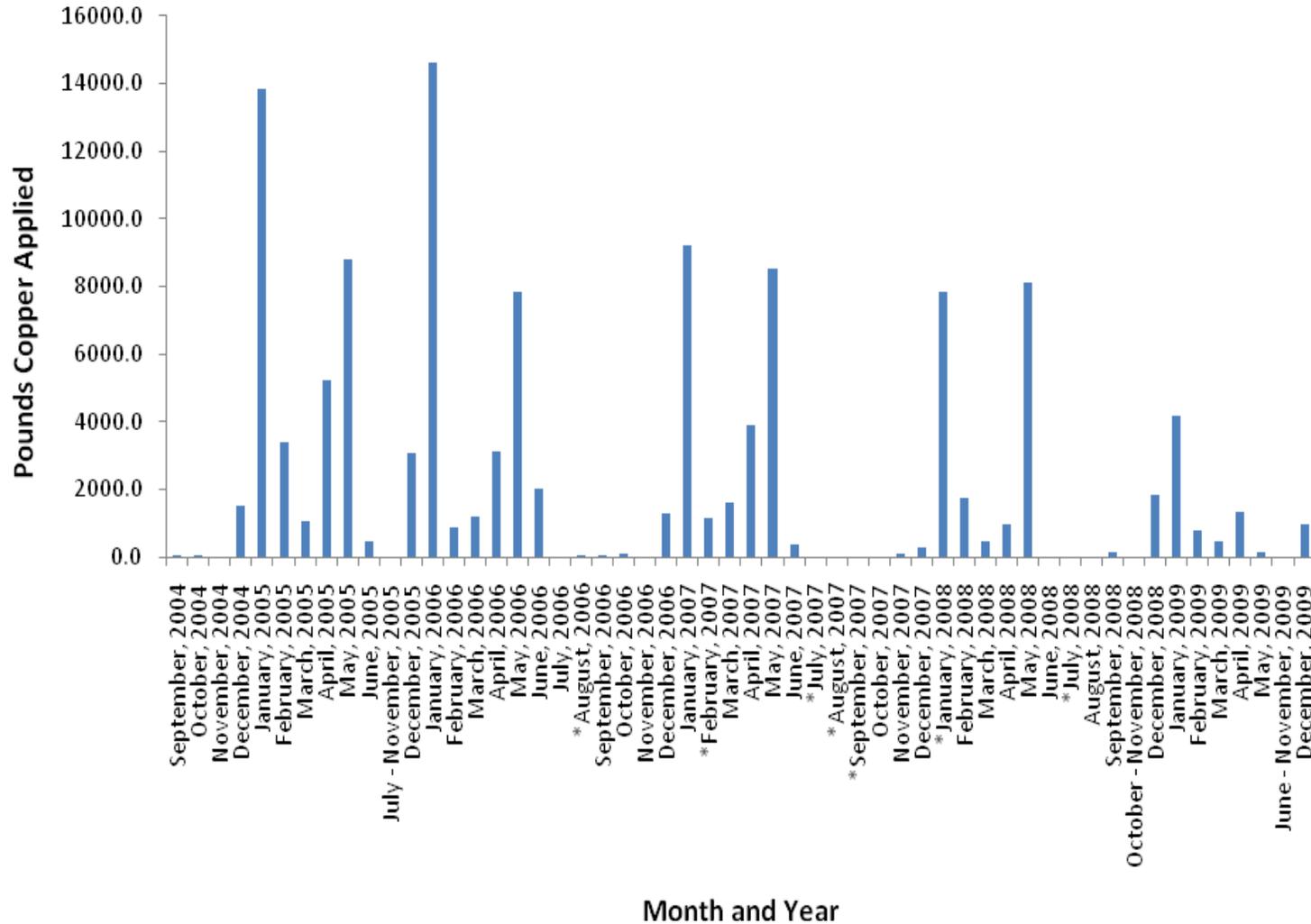


Table II-16. Total pounds active ingredient (AI) applied for copper based on PUR data from 2004-2009 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE DF	853.460
	ALMOND	BASIC COPPER 53	1623.125
		BASICOP	92.750
		BLUE SHIELD DF	12.320
		CHAMP FORMULA 2 FLOWABLE	159.896
		CHAMP FORMULA II DRY FLOWABLE	367.200
		CHAMPION WETTABLE POWDER	1111.690
		COPPER POWER FLOWABLE	7.500
		CUPROFIX ULTRA 40 DISPERS	391.050
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	8718.833
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	9.824
		HYDROX	4949.187
		KOCIDE 101	3428.040
		KOCIDE 2000	4322.423
		KOCIDE DF	8888.972
		NORDOX	872.230
		NORDOX 75 WG	16334.504
		NU-COP 50 WP	480.480
		NU-COP 50DF	12781.985
	APPLE	KOCIDE DF	12.280
	APRICOT	NORDOX 75 WG	19.297
	CHERRY	CHAMPION WETTABLE POWDER	81.810
		CUPROFIX DISPERS	208.116
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	167.856
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	564.266
		HYDROX	81.836
		KOCIDE 101	1078.000
		KOCIDE DF	437.475
		NORDOX	555.540
	NORDOX 75 WG	15.941	
	GRAPES	CHAMP FORMULA 2 FLOWABLE	377.609
		KOCIDE 101	554.400
		NU-COP 50DF	77.000
		TENN-COP 5E	41.617
		TENN-COP 5E	268.393

Chemical Name	Commodity	Product Name	Lbs AI Applied
		FUNGICIDE/BACTERICIDE	
	GRAPES, WINE	CHAMP FORMULA 2 FLOWABLE	444.038
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	116.218
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	414.037
		NU-COP 3L	361.609
		TENN-COP 5E FUNGICIDE/BACTERICIDE	2.440
	NECTARINE	BLUE SHIELD DF	38.500
		HYDROX	77.000
		NORDOX 75 WG	111.218
	PEACH	BLUE SHIELD DF	46.200
		HYDROX	38.500
		NORDOX 75 WG	455.845
		NU-COP 50DF	110.880
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	NORDOX 75 WG	19.297
	RICE	BLUE VIKING COPPER SULFATE STAR SHINE CRYSTAL	900.900
		CHIPCO COPPER SULFATE CRYSTALS	7979.400
	RICE (ALL OR UNSPEC)	CHIPCO COPPER SULFATE CRYSTALS	23581.008
	SOIL APPLICATION, PREPLANT- OUTDOOR (SEEDBEDS, ETC.)	KOCIDE 101	24.640
	TOMATO	KOCIDE DF	39.296
		NU-COP 50DF	154.000
	TOMATOES, FOR PROCESSING/CANNING	KOCIDE 101	84.700
	WALNUT	BLUE SHIELD	69.300
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	2771.242
		HYDROX	123.200
		KOCIDE 101	33.880
		KOCIDE 2000	817.212
		KOCIDE DF	273.598
		NORDOX	303.150
		NU-COP 50 WP	643.720
		NU-COP 50DF	1042.580
	NU-COP 50WP	69.300	
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	924.822
		HYDROX	308.000
		KOCIDE 101	2665.740

Chemical Name	Commodity	Product Name	Lbs AI Applied
		KOCIDE 2000	501.954
		KOCIDE DF	3625.547
		NU-COP 50 WP	38.500
		NU-COP 50DF	3796.100
ALFALFA – Total Pounds Copper Applied			853.460
ALMOND – Total Pounds Copper Applied			64552.009
APPLE – Total Pounds Copper Applied			12.280
APRICOT – Total Pounds Copper Applied			19.297
CHERRY – Total Pounds Copper Applied			3190.840
GRAPES – Total Pounds Copper Applied			2657.361
NECTARINE – Total Pounds Copper Applied			226.718
PEACH – Total Pounds Copper Applied			651.425
PLUM (INCLUDES PRUNES) – Total Pounds Copper Applied			19.297
RICE – Total Pounds Copper Applied			32461.308
SOIL APPLICATION, PREPLANT-OUTDOOR – Total Pounds Copper Applied			24.640
TOMATO – Total Pounds Copper Applied			277.996
WALNUT – Total Pounds Copper Applied			18007.845
Total pounds copper applied (2004 - 2009)			122,954.477

The Coalition will continue with its management plan strategy outlined above when conducting individual contacts. Previous analyses conducted by the Coalition in the 2009 Management Plan Update suggest that discharge from a few parcels is responsible for copper exceedances, and, consequently, management of this problem should focus on parcels with the potential to discharge directly to the creek. Orchard and vineyard operators will be advised to consider tail water management and practices to prevent copper from entering the waterway with runoff. Storm runoff management will also be discussed. Individual contacts occurring within this subwatershed are described under the chlorpyrifos outreach section above and have included discussions of copper exceedances and the above management practices.

Diuron

Diuron is a soluble herbicide applied throughout the year although the largest numbers are made in the winter and spring. Diuron exceedances have occurred twice during 2007 storm monitoring and once during 2008 storm monitoring. The Coalition did not monitor for diuron at Lone Tree Creek as a part of 2009 MPM.

Applications occur in every month of the year except August, September, and October, although the majority of past applications have occurred in the period between November and February. Very little diuron was applied during 2009 (20 lbs), especially compared to peak use in 2006 (889 lbs, Table II-17 and Figure II-5). Exceedances have occurred in winter months

following months with high amounts of diuron applied (Figure II-5). Crops receiving the most diuron applications are walnuts and alfalfa (Table II-18).

Table II-17. Number of diuron applications, total pounds applied, and total acres treated by month for August 2004 through December 2009 in the Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Diuron Applications	Pounds Applied	Acres Treated
November, 2004	2	24.4	39.1
December, 2004	9	274.8	286.33
January, 2005	5	55.5	124
February, 2005	4	58.7	93
April, 2005	1	19.6	7
January, 2006	4	80.7	151
February, 2006	7	93.6	95.5
March, 2006	1	8.2	8.33
April, 2006	1	19.6	47
May, 2006	2	33.6	40.4
June, 2006	2	23.1	47.5
July, 2006	1	16.4	16.67
November, 2006	3	120.9	124
December, 2006	8	492.7	337
January, 2007	1	13.0	13
February, 2007	2	18.8	19
March, 2007	3	48.8	99
April, 2007	1	33.2	17
May, 2007	3	22.2	24
November, 2007	2	29.3	172
December, 2007	3	168.5	89.33
February, 2008	2	40.8	20.93
March, 2008	1	8.2	8.33
May, 2008	2	22.3	22.67
November, 2008	2	12.2	12.56
January, 2009	3	11.3	31
March, 2009	1	8.2	8.33
Summaries by Year			
2004 Total	11	299.1	325.43
2005 Total	10	133.7	224
2006 Total	29	888.7	867.4
2007 Total	15	333.9	433.33
2008 Total	7	83.5	64.49
2009 Total	4	19.5	39.33
Total	76	1,758.5	1,953.98

Figure II-5. Pounds of diuron applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2009. Asterisk (*) denotes months with exceedances.

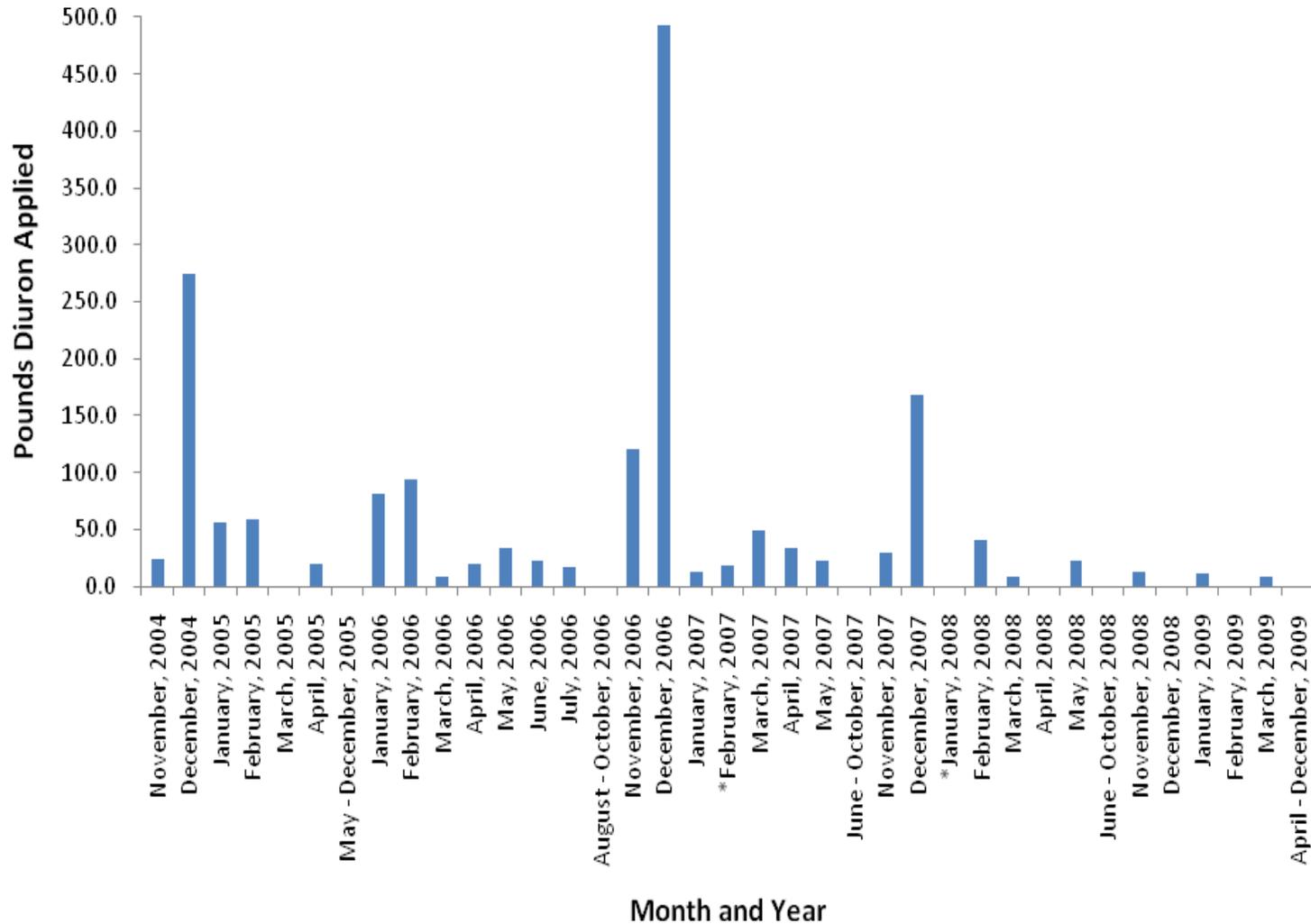


Table II-18. Total pounds active ingredient (AI) applied for diuron based on PUR data from 2004-2009 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIURON	ALFALFA	DUPONT DIREX 4L HERBICIDE	11.294
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	758.565
	GRAPES	DIREX 4L	107.946
		DU PONT KARMEX DF HERBICIDE	0.400
	GRAPES, WINE	DIREX 4L	24.637
		DREXEL DIURON 4L HERBICIDE	12.990
	PASTURES (ALL OR UNSPEC)	DIREX 4L	3.898
	WALNUT	DIREX 4L	77.660
		DIURON 400 HERBICIDE	37.160
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	714.139
DIURON 400 HERBICIDE		9.778	
ALFALFA – Total Pounds Diuron Applied			769.859
GRAPES – Total Pounds Diuron Applied			145.973
PASTURES – Total Pounds Diuron Applied			3.898
WALNUT – Total Pounds Diuron Applied			838.737
Total pounds diuron applied (2004 - 2009)			1,758.467

The Coalition has addressed diuron exceedances during outreach described above under the chlorpyrifos section. Diuron will be monitored during January and February 2011 to assess the implementation and effectiveness of management practices.

Priority D Constituents

Ceriodaphnia dubia, *Selenastrum capricornutum*, *Pimephales promelas* water column toxicity and *Hyalella azteca* sediment toxicity are listed as priority D constituents for Lone Tree Creek.

***Ceriodaphnia* toxicity**

Ceriodaphnia toxicity occurred in February 2006 and January 2008. Both toxicities were associated with an exceedance of the chlorpyrifos WQTL.

The Coalition’s strategy for eliminating *Ceriodaphnia* toxicity involves focusing on chlorpyrifos. If chlorpyrifos can be prevented from entering storm water during the winter, the Coalition believes that *Ceriodaphnia* toxicity can also be reduced or eliminated.

***Selenastrum* toxicity**

Selenastrum toxicity occurred in January, April and May of 2008. The January exceedance was associated with an exceedance of the diuron WQTL. No exceedances of herbicides occurred during April or May, but applications of copper were common prior to sampling in both months. 2009 MPM included sampling for toxicity to *Selenastrum* during April and May, but no toxicity occurred.

The Coalition's strategy for eliminating *Selenastrum* toxicity involves focusing on copper and diuron. If these two constituents can be prevented from entering storm water during the winter, the Coalition believes that *Selenastrum* toxicity can be reduced or eliminated. If the Coalition finds that diuron and copper exceedances are eliminated and *Selenastrum* toxicity persists, growers applying other herbicides will be targeted for outreach.

***Hyalella* toxicity**

Hyalella toxicity occurred in May 2005 and April 2006. The Coalition has initiated management plan sampling for sediment toxicities. As of 2009, the Coalition now tests for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. However, no MPM is scheduled for this site in 2010 or 2011.

***Pimephales* toxicity**

Pimephales toxicity occurred in February 2005 and 2006 as well as January 2008. The January 2008 toxicity was associated with an exceedance of the ammonia WQTL. Toxicity to *Pimephales* was not monitored during 2009 MPM because the Coalition believes the ammonia exceedances are a result of dairy discharges in the Lone Tree Creek subwatershed. Because dairies are not members of the SJCDWQC, the Coalition believes it will be difficult to monitor ammonia exceedances as non-members are often reluctant to cooperate with the Coalition and implement management practices.

Priority E Constituents

DO, pH, SC, TDS, *E. coli*, and ammonia are listed as priority E constituents for Lone Tree Creek. These constituents will remain low priority but have been discussed during individual contacts and annual grower meetings.

Evaluation

This subwatershed is one of the first three priority site subwatersheds within the SJCDWQC and therefore the Coalition has focused its resources on identifying the sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals.

The Coalition's strategy for the Lone Tree Creek subwatershed has been to target a large portion of growers applying products containing or related to the highest level priority constituents (chlorpyrifos, diazinon, copper, and diuron). Outreach includes grower notification, management practice outreach and education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practices and assess planned implementations have been completed and returned representing 76% of targeted growers. The Coalition will continue to collect surveys from targeted growers. These results will be assessed, and the Coalition is in the process of planning the final stages of outreach including re-contacting growers to identify newly implemented practices.

Number of applications, pounds applied, and acres treated with chlorpyrifos, diazinon, copper, and diuron have all decreased since 2005, which may be a result of educating growers about alternative products. Additionally, usage of particular products has decreased during their peak application months, for example diazinon in January. Despite this, chlorpyrifos still exceeded the WQTL once in Lone Tree Creek during August of 2009. Management Plan Monitoring in 2010 will indicate if a change in management practices as a result of individual contacts has resulted in long-term improvements to downstream water quality.

III. UNNAMED DRAIN TO LONE TREE CREEK @ JACK TONE RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper
- Diuron
- Simazine

Priority D

- *Ceriodaphnia dubia* water column toxicity
- *Selenastrum capricornutum* water column toxicity
- *Hyalella azteca* sediment toxicity

Priority E

- Dissolved Oxygen
- Lead
- Specific Conductivity
- Total Dissolved Solids
- *E. coli*

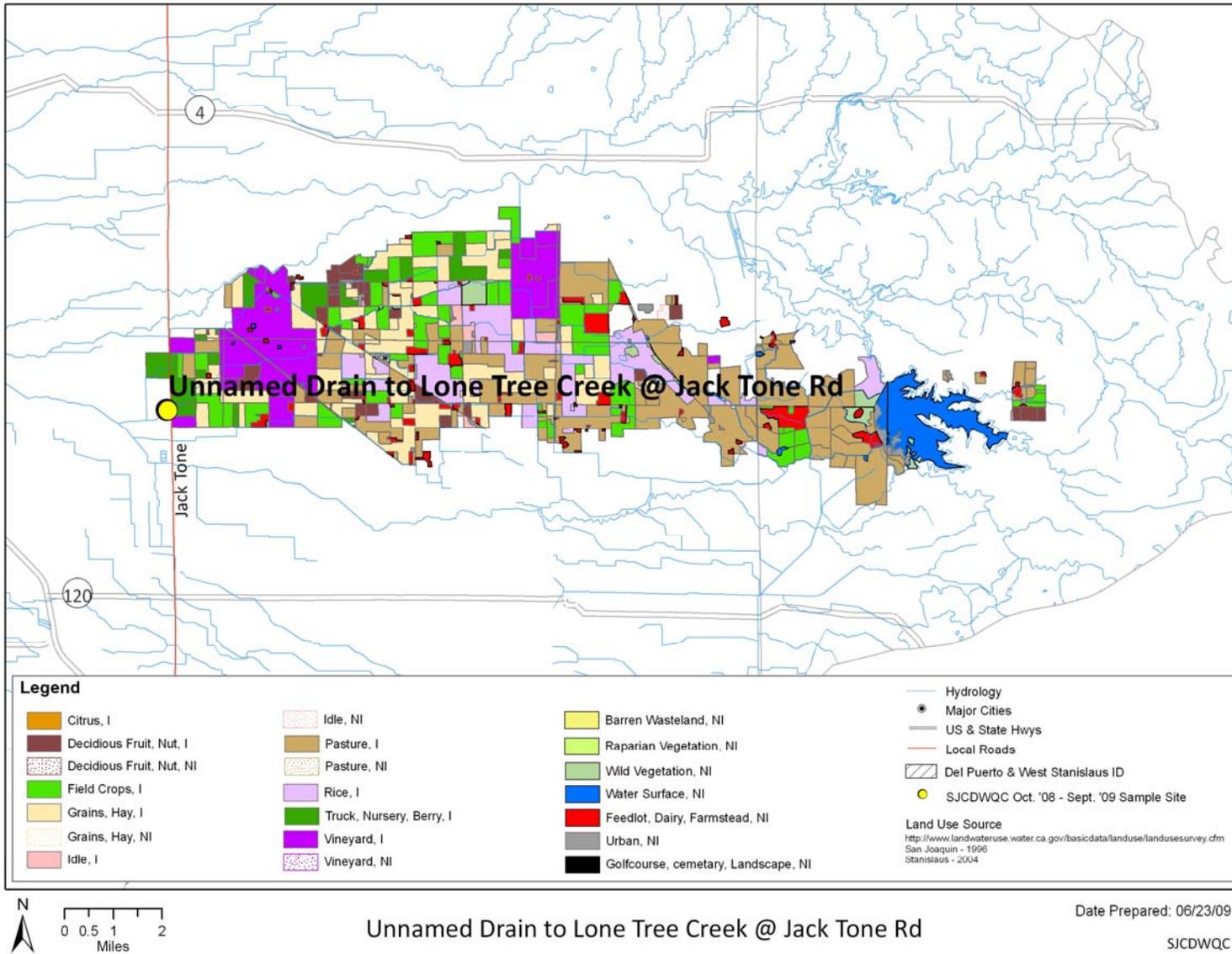
Description of Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (26,530 irrigated acres) – This site subwatershed is located to the north of the Lone Tree Creek site subwatershed and south of Littlejohns Creek. The drain forms in the eastern portion of San Joaquin County, flows west, and eventually confluence with Lone Tree Creek just west of Jack Tone Rd. Unlike most of the SJCDWQC area, rice is a major crop in the site subwatershed. Agriculture in the site subwatershed also consists of deciduous orchards, field crops, and grains. Figure III-1 provides the land use within this site subwatershed area. This site subwatershed includes an upstream location (Unnamed Drain to Lone Tee Creek @ Wagner Rd) which was sampled in 2008. Table III-1 includes the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

Table III-1. Coordinates of the Unnamed Drain to Lone Tree Creek site subwatershed sampling locations.

Station Name	Station Code	Target Lat	Target Long
Unnamed Drain to Lone Tree Creek @ Wagner Rd	531UDLTWR	37.8709	-121.0911
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	37.8536	-121.1457

Figure III-1. Site subwatershed map of land use for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sample site.



Subwatershed Monitoring History

Monitoring was initiated at Unnamed Drain to Lone Tree Creek (also called Temple Creek locally) during the irrigation season of 2006 and has continued through the irrigation season of 2009 (Table III-2). Specific information on the analysis conducted across each of the monitoring seasons is provided below (Table III-3). Unnamed Drain to Lone Tree Creek @ Jack Tone Rd is an Assessment Monitoring location under the current MRPP and the first monitoring rotation will occur in 2017-2018. The Coalition will conduct MPM at this site during the 2010 irrigation season.

Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season and included additional sampling at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd during July and September for chlorpyrifos (Table III-4 and Table III-5). The Management Plan sampling schedule for 2009 included sampling during all six months of the irrigation seasons for chlorpyrifos, copper, *Ceriodaphnia dubia* toxicity, and *Selenastrum capricornutum* toxicity (Table III-6). A summary and discussion of these exceedances are provided in the next section (Tables III-7 and III-8).

The Unnamed Drain to Lone Tree Creek (Temple Creek) is considered impaired in the proposed 2008 Basin Plan 303d list for ammonia, and electrical conductivity. The potential source of the impairment is listed as dairies.

Table III-2. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sampling events per season and year.

	2004		2005		2006		2007		2008			2009		
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	NA	NA	NA	4	2	6	1	6	NA	NA	NA	6	NA
Events Not Sampled	NA	NA	NA	NA	1 (Dry)	0	0	0	0	NA	NA	NA	0	NA
Total	NA	NA	NA	NA	5	2	6	1	6	NA	NA	NA	6	NA

Table III-3. Number of analyses performed per analyte in each sampling season and year for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2006	2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
Field and Physical Parameters											
NA	pH	4	4	9	4	10				6	
NA	Specific Conductivity	4	4	9	4	10				6	
NA	Dissolved Oxygen	3	4	9	4	10				6	
EPA 160.1	Dissolved Solids	4	2	6	1	6					
EPA 160.2	Suspended Solids										
EPA 180.1	Turbidity	4	2	6	1	6					
SM 9223 B	E. coli	4	2	6	1	6					
EPA 110.2	Color	4	2	6	1	6					
EPA 415.1	Total Organic Carbon	4	2	6	1	6					
EPA 405.1	Biological Oxygen Demand	1	2	2							
Carbamates											
EPA 8321A	Aldicarb	4	2	6	1	6					
EPA 8321A	Carbaryl	4	2	6	1	6					
EPA 8321A	Carbofuran	4	2	6	1	6					
EPA 8321A	Methiocarb	4	2	6	1	6					
EPA 8321A	Methomyl	4	2	6	1	6					
EPA 8321A	Oxamyl	4	2	6	1	6					
Organochlorines											
EPA 8081A	DDD	4	2	6	1	6					
EPA 8081A	DDE	4	2	6	1	6					
EPA 8081A	DDT	4	2	6	1	6					
EPA 8081A	Dicofol	4	2	6	1	6					
EPA 8081A	Dieldrin	4	2	6	1	6					
EPA 8081A	Endrin	4	2	6	1	6					

Method	Analyte	2006	2007		2008			2009				
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*	
EPA 8081A	Methoxychlor	4	2	6	1	6						
Organophosphates												
EPA 8141A	Azinphos methyl	4	2	6	1	6						
EPA 8141A	Chlorpyrifos	4	2	8	1	6				4		
EPA 8141A	Diazinon	4	2	6	1	6						
EPA 8141A	Dimethoate	4	2	6	1	6						
EPA 8141A	Disulfoton	4	2	6	1	6						
EPA 8141A	Malathion	4	2	6	1	6						
EPA 8141A	Methamidophos	4	2	6	1	6						
EPA 8141A	Methidathion	4	2	6	1	6						
EPA 8141A	Parathion, Methyl	4	2	6	1	6						
EPA 8141A	Phorate	4	2	6	1	6						
EPA 8141A	Phosmet	4	2	6	1	6						
Pyrethroids												
EPA 8081A	Bifenthrin	4	2	6	1	6						
EPA 8081A	Cypermethrin	4	2	6	1	6						
EPA 8081A	Cyhalothrin, lambda	4	2	6	1	6						
EPA 8081A	Permethrin	4	2	6	1	6						
EPA 8081A	Cyfluthrin	4	2	6	1	6						
EPA 8081A	Esfenvalerate/ Fenvalerate	4	2	6	1	6						
Triazines												
EPA 619	Atrazine	4	2	6	1	6						
EPA 619	Cyanazine	4	2	6	1	6						
EPA 8321A	Diuron	4	2	6	1	6						
EPA 574M	Glyphosate	4	2	6	1	6						
EPA 8321A	Linuron	4	2	6	1	6						
EPA 8141A	Molinate	4	2	6	1	6						

Method	Analyte	2006	2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 549.2M	Paraquat dichloride	4	2	6	1	6					
EPA 619	Simazine	4	2	6	1	6					
EPA 8141A	Thiobencarb	4	2	6	1	6					
Metals (Total)											
EPA 200.8	Arsenic					6					
EPA 200.8	Boron					6					
EPA 200.8	Cadmium					6					
EPA 200.8	Copper					6				5	
EPA 200.8	Lead					6					
EPA 200.8	Nickel					6					
EPA 200.8	Selenium					6					
EPA 200.8	Zinc					6					
Metals (Dissolved)											
EPA 200.8	Cadmium										
EPA 200.8	Copper									5	
EPA 200.8	Lead										
EPA 200.8	Nickel										
EPA 200.8	Zinc										
Nutrients											
EPA 350.2	Ammonia as N					6					
SM 2340 C	Hardness as CaCO3					6				5	
EPA 300.0	Nitrate as N					6					
EPA 353.2	Nitrate + Nitrite as N										
EPA 354.1	Nitrite as N					6					
EPA 351.3	Nitrogen, Total Kjeldahl					6					
EPA 365.2	Orthophosphate as P					6					
EPA 365.2	Phosphate as P					6					
Toxicity											

Method	Analyte	2006	2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 821-02-012	Ceriodaphnia dubia	4	3	6	2	7				1	
EPA 821-02-012	Pimephales promelas	4	2	6	1	6					
EPA 821-02-013	Selenastrum capricornutum	4	4	6	1	7				1	
EPA 600/R-99-064	Hyalella azteca	1	1	2	2	2					

*Site not sample in the 2008 fall and 2009 winter, storm and fall seasons.

Table III-4. Unnamed Drain to Lone Tree Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	30-Jul-07	A	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	25-Sep-07	A	X

Table III-5. Unnamed Drain to Lone Tree Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos
Unnamed Drain to Lone Tree Creek @ Wagner Rd	15-Jul-08	U	X
Unnamed Drain to Lone Tree Creek @ Wagner Rd	16-Sep-08	U	X

Table III-6. Unnamed Drain to Lone Tree Creek site subwatershed. 2009 Management Plan sampling schedule for chlorpyrifos, copper, *Ceriodaphnia dubia* toxicity and *Selenastrum capricornutum* toxicity. "X" indicates the site, month and analyte sampled.

Site Name	Sample Date	<i>Ceriodaphnia dubia</i> Toxicity	<i>Selenastrum capricornutum</i> Toxicity	Copper	Chlorpyrifos
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	14-Apr-09			X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12-May-09		X	X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	09-Jun-09				X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	14-Jul-09			X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11-Aug-09			X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	15-Sep-09	X		X	X

Exceedance History

During Coalition monitoring, exceedances of water quality trigger limits for field and physical parameters, *E. coli*, pesticides, and water column and sediment toxicity have occurred within the Unnamed Drain to Lone Tree Creek site subwatershed. Samples collected over the four years of monitoring at the Unnamed Drain to Lone Tree Creek sample site resulted in exceedances of DO (6), pH (1), SC (2), TDS (1), *E. coli* (10), DDE (1), copper (5), lead (2), carbofuran (1), chlorpyrifos (14), diuron (3), methidathion (1), simazine (2), and thiobencarb (3). Toxicity has occurred five times to *Ceriodaphnia dubia* and five times to *Selenastrum capricornutum*. Sediment toxicity to *Hyalella azteca* occurred four times.

The 2009 irrigation season resulted in one DO and three chlorpyrifos exceedances, and one instance of water column toxicity to *Ceriodaphnia dubia*.

All exceedances are listed in Tables III-7 and III-8 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. Constituents under a management plan are prioritized using the SJCDWQC Management Plan prioritization process flow chart (Figure 3). The priority level (A-E) assigned to each constituent is listed in the bottom row of Tables III-7 and III-8.

Table III-7. Field, bacteria, inorganic and legacy pesticides (low priority) experienced in samples collected from locations within the Unnamed Drain to Lone Tree Creek site subwatershed between April 2006 and September 2009 (sorted by season and date). The WQTL used to evaluate the data is listed in the header after the analyte.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, 700 µS/cm	Dissolved Solids, 450 mg/L	<i>E. coli</i> , 235 MPN/100 mL	DDE (p,p') ¹ , 0.00059 µg/L
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	6/20/2006	4.8					0.004
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/18/2006	6				2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/11/2007					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/28/2007					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	3/6/2007			841			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	5/22/2007			905	620		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/10/2007					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/7/2007					250	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	1/23/2008					>2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	4/15/2008					250	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	5/13/2008	5.61	6.17			460	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/15/2008					690	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/12/2008					260	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/16/2008	6.7					
<i>Unnamed Drain to Lone Tree Creek @ Wagner Rd</i>	<i>Irrigation</i>	<i>9/16/2008</i>	<i>6.6</i>					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/11/2009	6.28					
Constituent Priority			E	NP	E	E	E	NP

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.

Table III-8. Metals, pesticides and toxicity exceedances (high priority) experienced in samples collected from locations within the Unnamed Drain to Lone Tree Creek site subwatershed between April 2006 and September 2009 (sorted by season and date). If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Station Name	Season	Sample Date	Copper Total, µg/L	Lead Total, µg/L	Carbofuran, 0 µg/L	Chlorpyrifos, 0.015 µg/L	Diuron ¹ , 2 µg/L	Methidathion ¹ , 0.7 µg/L	Simazine ¹ , 4 µg/L	Thiobencarb ¹ , 0 µg/L	<i>C. dubia</i> , Survival (%)	<i>H. azteca</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	6/20/2006								0.12			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/18/2006				0.031							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/19/2006				0.045							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/11/2007				0.048	19	1.1	7		0		475000
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/21/2007											926000
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/28/2007					29						55300
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	3/7/2007											504000
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	6/12/2007								0.57			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/10/2007				0.034							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/9/2007										57	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/25/2007				0.017							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	1/23/2008				0.045	7.7		6.4		0		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Sediment	3/18/2008										54	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Sediment	4/9/2008										21	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	4/15/2008	23 (8.4)	6.1 (2.7)									
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	5/13/2008	7.8 (6.5)		0.64	0.41							1126514
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	6/10/2008				0.12				0.12J			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/15/2008	6.9 (5.7)			0.028							

Station Name	Season	Sample Date	Copper Total, µg/L	Lead Total, µg/L	Carbofuran, 0 µg/L	Chlorpyrifos, 0.015 µg/L	Diuron ¹ , 2 µg/L	Methidathion ¹ , 0.7 µg/L	Simazine ¹ , 4 µg/L	Thiobencarb ¹ , 0 µg/L	<i>C. dubia</i> , Survival (%)	<i>H. azteca</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/12/2008	6.8 (5.9)										
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Sediment	8/13/2008										82	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/16/2008	6.5 (4.3)	1.3 (1.0)		0.12					0		
<i>Unnamed Drain to Lone Tree Creek @ Wagner Rd</i>	<i>Irrigation</i>	<i>9/16/2008</i>				<i>0.14</i>							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/23/2008									65		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	5/12/2009				0.032							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/14/2009				0.66							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/15/2009				0.086					30		
Constituent Priority			C	E	NP	A/B	C	NP	C	NP²	D	D	D

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.

NP² – not prioritized; thiobencarb is a pesticide applied only to rice and is therefore reported to the Regional Board and the Rice Coalition to manage.

2007 - 2009 Management Plan Monitoring Results

Management Plan Monitoring was conducted at the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd monitoring site for chlorpyrifos from 2007-2009. In 2009 copper and toxicity for *Ceriodaphnia dubia* and *Selenastrum capricornutum* were added.

2007

Additional monitoring at Unnamed Drain to Lone Tree Creek occurred in 2007 during July and September for chlorpyrifos, as well as monthly as a part of normal monitoring (Table III-9). Chlorpyrifos was detected in the additional July sample, and exceeded the WQTL during normal monitoring sample in July (0.034 µg/L) and the additional September sample (0.017 µg/L).

2008

In 2008, chlorpyrifos exceeded the WQTL during normal monitoring in the months of May, June, July, and September (Table III-9). There was also a detection during normal monitoring in August that was very close to the WQTL (0.014µg/L). Upstream MPM (Lone Tree Creek @ Wagner Rd) occurred for chlorpyrifos in July and September of 2008, and resulted in an exceedance during September (Table III-9).

2009

The Coalition conducted MPM during the 2009 irrigation season for the following constituents: copper (total and dissolved: April, May, July, August, September), chlorpyrifos (May, June, July, September), *Selenastrum* toxicity (May) and *Ceriodaphnia* toxicity (September). Chlorpyrifos exceeded the WQTL in May, July, and September, and toxicity to *Ceriodaphnia* was experienced in September as well.

Samples were collected for analysis of chlorpyrifos, diuron, simazine, and *Ceriodaphnia* and *Selenastrum* toxicity during January, February, and/or March of 2010 sampling. These results will be reported in the 2011 Management Plan Update.

Management Plan Monitoring is scheduled for copper, chlorpyrifos, and toxicity to *Ceriodaphnia*, *Selenastrum*, and *Hyaella* during the 2010 irrigation season. Chlorpyrifos, diuron, simazine and toxicity to *Ceriodaphnia*, *Selenastrum*, and *Hyaella* are also scheduled for monitoring in January, February, and March 2011 MPM.

Table III-9. Unnamed Drain to Lone Tree Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM for chlorpyrifos (2008). MPM was conducted for chlorpyrifos, copper, *Ceriodaphnia dubia* toxicity and *Selenastrum capricornutum* toxicity during the 2009 irrigation season. Exceedance values are in bold.

	Month	April	May	June	July	August	September
2007 NM (@ Jack Tone Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	0.034	<0.003	<0.003
2007 MPM A (@ Jack Tone Rd)	Date	NA	NA	NA	7/30/07	NA	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	0.014	NA	0.017
2008 NM (@ Jack Tone Rd)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	<0.003	0.410	0.120	0.028	0.014	0.120
2008 MPM US (@ Wagner Rd)	Date	NA	NA	NA	7/15/08	NA	9/16/08
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	0.140
2009 MPM (@ Jack Tone Rd)	Date	4/14/09	5/12/09	6/09/09	7/14/09	8/11/09	9/15/01
	Chlorpyrifos (µg/L)	NA	0.032	<0.003	0.660	NA	0.086
	Copper, dissolved (µg/L)	4.3	5.0	NA	1.5	1.5	2.5
	Copper, total (µg/L)	8.5	7.3	NA	4.6	3.8	5.0
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	NA	NA	30
	<i>S. capricornutum</i> toxicity (% Control)	NA	500	NA	NA	NA	NA

NA - Not applicable. This site was not sampled during this month.

Load Calculations

Loads have been calculated for all chlorpyrifos detections in the site subwatershed based on the following formula (Table III-10):

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (milligram/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

The load values for constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide a normalization of the concentrations by flow for various constituents at the time the samples were collected.

Table III-10. Unnamed Drain to Lone Tree Creek site subwatershed. Instantaneous load calculations for chlorpyrifos, copper, diuron and simazine where discharge was measured (sorted by site, analyte, and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	18-Jul-06	40.64	0.031	35.67
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	15-Aug-06	17.86	0.011	5.56
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	19-Sep-06	10.41	0.045	13.27
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	11-Feb-07	27.09	0.048	36.82
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	10-Jul-07	21.51	0.034	20.71

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	30-Jul-07	32.45	0.014	12.86
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	25-Sep-07	15.92	0.017	7.66
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	23-Jan-08	12.18	0.079	27.25
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	23-Jan-08	12.18	0.045	15.52
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	13-May-08	21.52	0.41	249.85
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	10-Jun-08	15.85	0.12	53.86
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	15-Jul-08	17.55	0.028	13.91
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12-Aug-08	11.11	0.014	4.40
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	16-Sep-08	18.38	0.12	62.46
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	16-Sep-08	18.38	0.12	62.46
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12-May-09	2.48	0.032	2.25
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	14-Jul-09	2.12	0.66	39.62
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	15-Sep-09	15.82	0.086	38.53
Unnamed Drain to Lone Tree Creek @ Wagner Rd	Chlorpyrifos	16-Sep-08	30.9	0.14	122.50
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	15-Apr-08	4.67	23	3041.53
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	13-May-08	21.52	7.8	4753.18
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	10-Jun-08	15.85	4.8	2154.36
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	15-Jul-08	17.55	6.9	3429.05
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	12-Aug-08	11.11	6.8	2139.29
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Copper	16-Sep-08	18.38	6.2	3226.89
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	16-Sep-08	18.38	6.5	3383.03
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (Dissolved)	14-Apr-09	2.74	4.3	333.63
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	14-Apr-09	2.74	8.5	659.50
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (Dissolved)	12-May-09	2.48	5	351.13
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	12-May-09	2.48	7.3	512.65
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	14-Jul-09	2.12	4.6	276.15
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (Dissolved)	14-Jul-09	2.12	1.5	90.05

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	11-Aug-09	10.5	3.8	1129.85
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (Dissolved)	11-Aug-09	10.5	1.5	445.99
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	15-Sep-09	15.82	5	2239.87
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (Dissolved)	15-Sep-09	15.82	2.5	1119.94
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	11-Feb-07	27.09	19	14575.04
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	28-Feb-07	7.49	29	6150.74
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	10-Apr-07	3.56	1.6	161.29
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	22-May-07	0	1.5	0
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Diuron	23-Jan-08	12.18	7.8	2690.23
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	23-Jan-08	12.18	7.7	2655.74
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	15-Apr-08	4.67	0.72	95.21
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	13-May-08	21.52	0.54	329.07
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	10-Jun-08	15.85	0.29	130.16
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	11-Feb-07	27.09	7	5369.75
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	28-Feb-07	7.49	2.4	509.03
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	10-Apr-07	3.56	0.08	8.06
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	22-May-07	0	3.4	0
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Simazine	23-Jan-08	12.18	8.4	2897.17
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	23-Jan-08	12.18	6.4	2207.37
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	15-Apr-08	4.67	1	132.24

*Field duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos

The WQTL for chlorpyrifos (0.015 µg/L) was exceeded fourteen times at this site during the months of January (2008), February (2007), May (2008, 2009), June (2008), July (2006, 2007, 2008, 2009) and September (2006, 2007, 2008, 2009) (Table III-8).

The greatest amount of chlorpyrifos applied was in 2006 (6,760 lbs) with the lowest amount in 2008 (1,904 lbs, Table III-11, Figure III-2). The number of applications and acres treated with chlorpyrifos in this subwatershed has decreased annually since 2006; however the pounds of chlorpyrifos used in 2009 increased compared to 2008 usage (Table III-11, Figure III-2). Chlorpyrifos use during the latter irrigation months remains low, with no use in September; however exceedances were experienced in 2009 in both July and September (Figure III-2).

The pounds applied in May 2009 are down slightly from the 2008 level, although chlorpyrifos again exceeded the WQTL in May 2009. Corn (7,970 lbs) received the highest applications of chlorpyrifos followed by walnuts (4,823 lbs, Table III-12). The most common product used within this subwatershed containing chlorpyrifos was Lorsban (Table III-12).

Table III-11. Number of chlorpyrifos applications, pounds applied and acres treated for January 2006 through December 2009 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
March, 2006	1	50.0	25
April, 2006	6	168.4	382
May, 2006	28	2168.0	1297.3
June, 2006	25	2515.2	1747.5
July, 2006	15	1037.5	673.5
August, 2006	6	340.6	290
September, 2006	6	294.1	295
November, 2006	1	185.8	100
March, 2007	7	253.2	299
April, 2007	12	519.8	626
May, 2007	23	2208.2	1558
June, 2007	18	1285.5	1064
July, 2007	3	103.1	74
August, 2007	2	160.0	74
October, 2007	1	199.4	100
March, 2008	6	206.0	338
April, 2008	2	182.3	157
May, 2008	10	955.5	643
June, 2008	2	208.4	231
July, 2008	6	351.7	247
March, 2009	8	593.4	490
May, 2009	1	247.7	122.5
June, 2009	2	214.1	117
July, 2009	6	516.9	312.5
August, 2009	4	414.6	207
November, 2009	3	631.9	336.5
Summaries by Year			
2006 Total	88	6759.7	4810.3
2007 Total	81	5803.6	4501
2008 Total	26	1903.9	1616
2009 Total	24	2618.5	1585.5
Total	219	17,085.7	12,512.8

Figure III-2. Pounds of chlorpyrifos applied within the Unnamed Drain to Lone Tree Creek site subwatershed by month for 2006-2009. Asterisk (*) denotes months with exceedances.

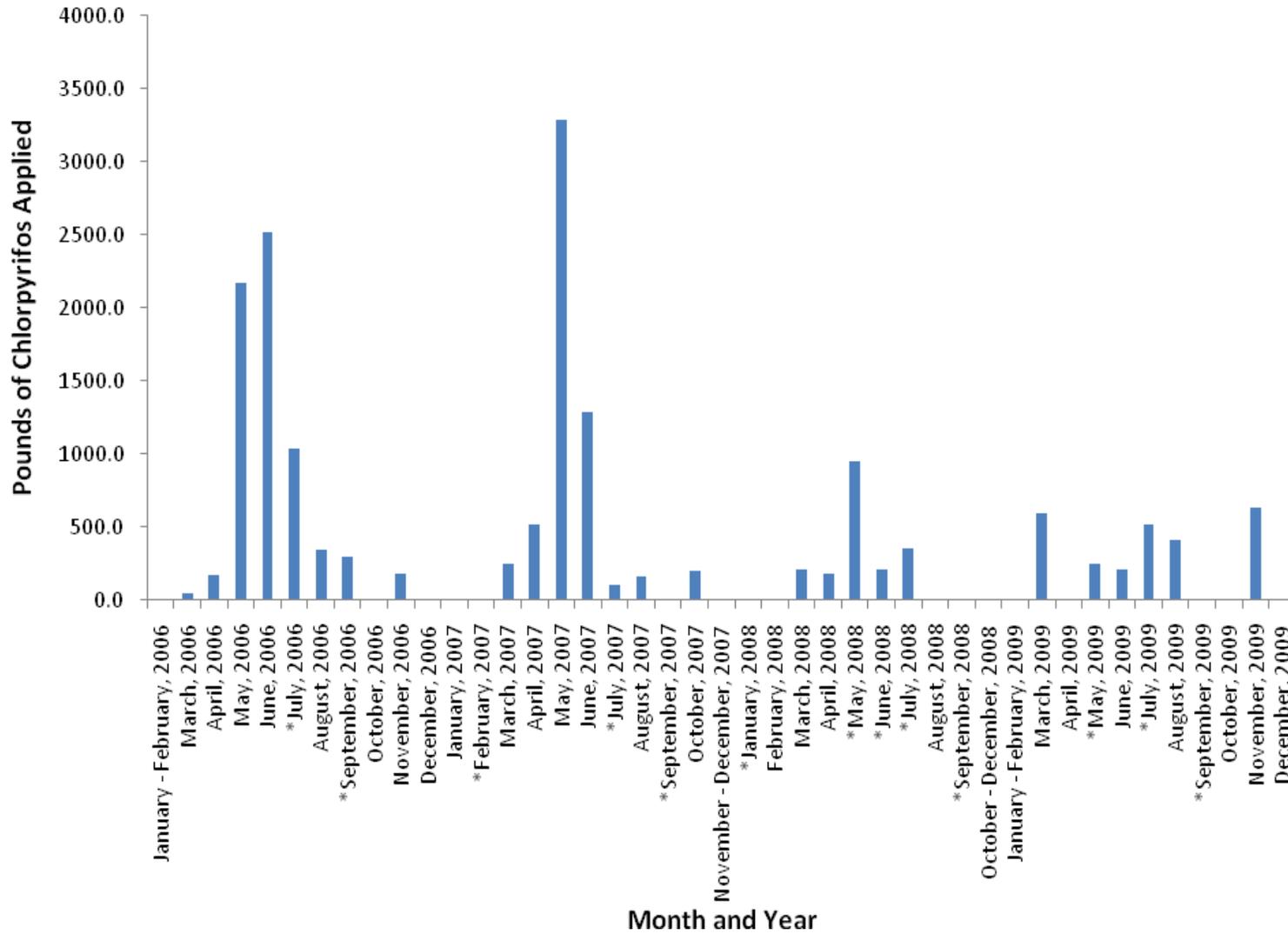


Table III-12. Total pounds active ingredient (AI) for chlorpyrifos based on PUR data from 2006-2009 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA	LOCK-ON INSECTICIDE	34.971
		LORSBAN 4E-HF	554.793
		LORSBAN-4E	57.600
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	60.850
		LORSBAN 4E-HF	332.726
	ALMOND	LORSBAN 4E-HF	103.680
		LORSBAN-4E	1773.814
		WARHAWK	94.940
	APPLE	LORSBAN-4E	262.147
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	3260.250
		LORSBAN 4E-HF	386.060
		LORSBAN-4E	23.601
		NUFOS 15G	121.500
	CORN FOR/FOD	LORSBAN 15G GRANULAR INSECTICIDE	3032.700
		LORSBAN 4E-HF	39.880
		LORSBAN-4E	85.490
		NUFOS 15G	946.200
		NUFOS 4E	74.230
	GRAPES, WINE	LORSBAN 4E-HF	199.385
		LORSBAN ADVANCED	631.946
		LORSBAN-4E	185.838
	WALNUT	GOVERN 4E INSECTICIDE	298.162
		LORSBAN 4E INSECTICIDE	553.281
		LORSBAN 4E-HF	31.900
LORSBAN-4E		852.275	
WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOVERN 4E INSECTICIDE	359.572	
	LORSBAN 4E INSECTICIDE	297.042	
	LORSBAN 4E-HF	799.535	
	LORSBAN-4E	1631.332	
ALFALFA – Total Pounds Chlorpyrifos Applied			1040.941
ALMOND – Total Pounds Chlorpyrifos Applied			1972.434
APPLE – Total Pounds Chlorpyrifos Applied			262.147
CORN – Total Pounds Chlorpyrifos Applied			7969.911
GRAPES – Total Pounds Chlorpyrifos Applied			1017.170
WALNUT – Total Pounds Chlorpyrifos Applied			4823.098
Total pounds chlorpyrifos applied (2006 - 2009)			17,085.700

Previous analyses conducted by the Coalition in the 2009 Management Plan Update suggest a few parcels are responsible for the chlorpyrifos exceedances and management should focus on growers located adjacent to the drain. Almond, walnut, and corn growers should be targeted for outreach, especially prior to the irrigation season. The Coalition noted that several growers employ recirculation and/or tail water return systems (40% member acreage), allow grass to grow down orchard row centers (26% member acreage), and maintain vegetative filter strips around field edges and/or waterways (20% member acreage) to reduce runoff. However, the Coalition feels this can be increased and will focus outreach to encourage management practices to retain and manage irrigation tail water.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition focused outreach to growers who had used chlorpyrifos within the last two years and contacted grower permittees associated with the targeted growers. Beginning in the fall of 2008, the Coalition made several individual contacts with permittees and/or growers to discuss the Unnamed Drain Management Plan strategy and relevant management practices. The Coalition also invited members to a Mid Valley Agricultural Services hosted grower meeting in March 2009 to further expand their grower audience as well as highlight chlorpyrifos management practices immediately. Individual contacts focused mainly on chlorpyrifos exceedances however all water quality results were reviewed and discussed including copper, diuron, simazine and lead exceedances, *Ceriodaphnia*, *Selenastrum* and *Hyalella* toxicity, and DO, SC, TDS and E. coli exceedances. Surveys were completed that document members' current practices and indicate which recommended practices growers anticipated implementing in the upcoming year. The Coalition is in the process of compiling and assessing the surveys.

The Coalition contacted 39 permittees whom are associated with 35 different farming operations. To date, the Coalition has received surveys from 28 targeted members and is in the process of reviewing and analyzing the data. The Coalition will follow up via a phone call and/or additional mailings with the remaining 11 targeted members to encourage them to complete the survey. This will be completed by October 2010.

The Coalition will contact members in the fall of 2010 through the winter of 2011 to determine which additional management practices were implemented in 2010 and if additional practices are planned for 2011. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year. Not all growers will need to be contacted during the second fall. To obtain the information on practices implemented since the interview/meeting, the Coalition anticipates either conducting phone calls or sending out a brief letter that includes a survey for the grower to complete.

To evaluate the implementation of new management practices, the Coalition will monitor at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd during 2010. Depending on when additional management practices are implemented, the Coalition may monitor through 2011 to

evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage or have the potential for spray drift will improve downstream water quality by the end of the second year as a high priority site subwatershed.

Priority C constituents

Copper

The WQTL for copper was not exceeded at this site during 2009 MPM, which is an improvement over the 2008 irrigation season in which there was an exceedance in every month except June.

Copper is one of the most heavily applied pesticides in the site subwatershed. Since 2006, the number of copper applications, amount of copper applied (pounds AI), and the number of acres treated has decreased (Table III-13, Figure III-3). The largest amount applied was in 2007 (25,345 lbs) and the smallest amount was applied in 2009 (8,023 lbs). Interestingly, more acres were treated in 2009 than 2008 which indicates a lower rate of chemical applied per acre. In 2009, there was a spike in pounds applied in April and a decline in pounds applied in May compared to 2008 levels, yet no exceedances were experienced in 2009 in either month.

Walnuts (33,346 lbs) and rice (23,215 lbs) receive the most copper, with almonds a distant third (5,170 lbs) (Table III-14). Rice growers do not belong to the Coalition. Several different products containing copper are used throughout the Coalition area, including DuPont Kocide and Kocide (Table III-14).

Table III-13. Number of copper applications, total pounds applied and total acres treated by month for January 2006 through December 2009 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
January, 2006	5	1491.3	265
February, 2006	5	234.3	200.5
March, 2006	17	724.3	578.5
April, 2006	30	6351.9	1623.44
May, 2006	35	11276.6	1678
June, 2006	10	2167.0	569
July, 2006	6	609.8	396
August, 2006	3	152.0	106
September, 2006	6	351.4	235.5
October, 2006	5	338.8	217
January, 2007	6	2082.8	541
February, 2007	2	93.5	97
March, 2007	14	2380.3	560
April, 2007	38	8422.1	1675
May, 2007	22	11473.6	1402
June, 2007	3	759.4	141
July, 2007	1	56.5	70

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
December, 2007	1	77.0	8
January, 2008	2	406.9	88
February, 2008	3	140.9	114.25
March, 2008	8	524.4	244.29
April, 2008	10	1498.7	316.5
May, 2008	11	7206.2	606
June, 2008	1	86.0	70
December, 2008	1	234.6	44
January, 2009	4	498.2	104
February, 2009	2	176.4	133
March, 2009	6	1572.6	271.8
April, 2009	19	5290.3	1357
May, 2009	2	394.2	64
December, 2009	2	91.3	16
Summaries by Year			
2006 Total	122	23697.4	5868.94
2007 Total	87	25345.2	4494
2008 Total	36	10097.8	1483.04
2009 Total	35	8023.1	1945.8
Total	280	67,163.4	13,791.78

Figure III-3. Pounds of copper applied within the Unnamed Drain to Lone Tree Creek site subwatershed by month for 2006-2009. Asterisk (*) denotes months with exceedances.

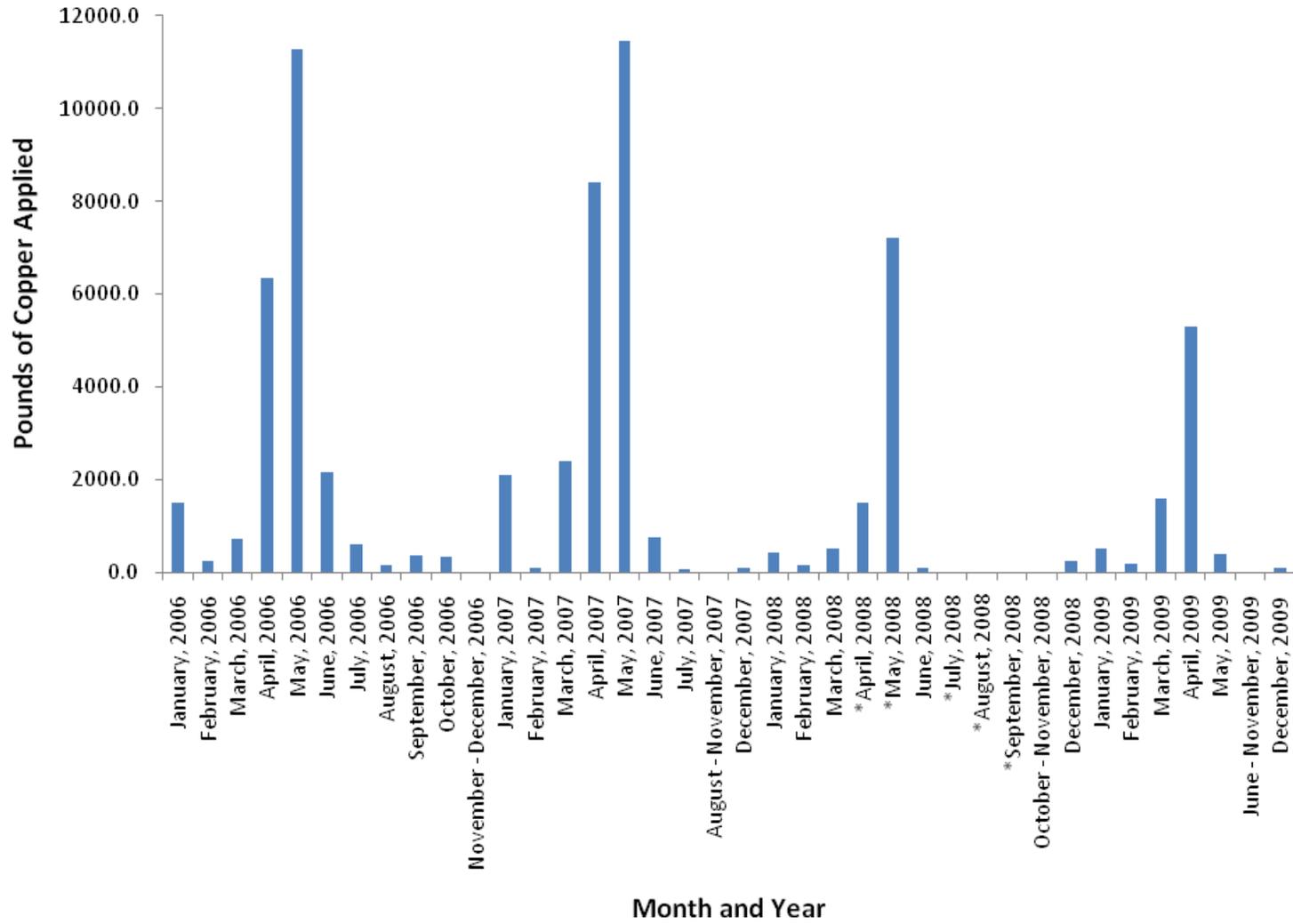


Table III-14. Total pounds AI for copper based on PUR data from 2006-2009 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE DF	329.104
	ALMOND	BLUE SHIELD DF	12.320
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	76.665
		KOCIDE 101	1378.854
		KOCIDE 2000	1507.476
		KOCIDE DF	750.922
		NORDOX	76.140
		NORDOX 75 WG	1318.494
		NU-COP 50DF	49.280
	CHERRY	HTH ALKALINITY PLUS	234.630
		KOCIDE 101	214.920
		NU-COP 50DF	635.250
	GRAPES	CHAMP FORMULA 2 FLOWABLE	444.728
		TENN-COP 5E FUNGICIDE/BACTERICIDE	509.890
	GRAPES, WINE	COPPER-COUNT-N	1.550
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	216.347
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	185.176
		NU-COP 3L	284.701
		STRETCH FUNGICIDE	3.510
	NECTARINE	NORDOX 75 WG	91.283
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	85.960
		KOCIDE 101	1001.770
	ONION DRY ETC	KOCIDE 2000	169.470
	PEACH	NORDOX 75 WG	91.283
	PEAR	KOCIDE 101	16.247
	PEPPERS (FRUITING VEGETABLE), (BELL, CHILI, ETC.)	KOCIDE DF	100.696
	RICE	BLUE VIKING COPPER SULFATE STAR SHINE CRYSTAL	2128.500
		CHIPCO COPPER SULFATE CRYSTALS	6890.400
	RICE (ALL OR UNSPEC)	CHIPCO COPPER SULFATE CRYSTALS	14195.610
	TOMATO	HYDROX	101.640
KOCIDE DF		13.694	
NU-COP 50DF		639.870	

Chemical Name	Commodity	Product Name	Lbs AI Applied
	TOMATOES, FOR PROCESSING/CANNING	KOCIDE DF	61.400
	WALNUT	BLUE SHIELD DF	92.400
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	378.224
		HYDROX	308.000
		KOCIDE 101	3036.880
		KOCIDE 2000	616.550
		KOCIDE DF	1538.684
		NORDOX 75 WG	71.315
		NU-COP 50 WP	308.000
		NU-COP 50DF	13618.451
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	681.108
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	147.520
		HYDROX	500.500
		KOCIDE 101	3383.500
		KOCIDE DF	3165.907
		NU-COP 50 WP	612.150
		NU-COP 50DF	4886.420
	ALFALFA – Total Pounds Copper Applied	329.104	
	ALMOND – Total Pounds Copper Applied	5170.151	
	CHERRY – Total Pounds Copper Applied	1084.800	
	GRAPES – Total Pounds Copper Applied	1645.902	
	NECTARINE – Total Pounds Copper Applied	91.283	
	ONION – Total Pounds Copper Applied	1257.200	
	PEACH – Total Pounds Copper Applied	91.283	
	PEAR – Total Pounds Copper Applied	16.247	
	PEPPERS – Total Pounds Copper Applied	100.696	
	RICE – Total Pounds Copper Applied	23214.510	
	TOMATO – Total Pounds Copper Applied	816.604	
	WALNUT – Total Pounds Copper Applied	33345.609	
	Total pounds copper applied (2006 - 2009)	67,163.389	

The Coalition will continue with its management plan strategy outlined above under the chlorpyrifos outreach section when conducting individual contacts. Previous analyses reported by the Coalition in the 2009 Management Plan Update suggest that management of copper in this watershed should focus on growers making applications late in the summer that appear to be associated with exceedances. Orchard and vineyard operators will be advised to consider irrigation tail water retention to prevent copper from entering the waterway with runoff.

Storm runoff management relevant to copper applications will also be discussed to prevent the winter exceedances. Individual contacts occurring within this subwatershed are described under the chlorpyrifos outreach section above and have included discussions of copper exceedances and the above management practices.

Diuron

Diuron is a soluble herbicide applied throughout the year. There was a single exceedance of diuron in January 2008 and two exceedances during February storm monitoring in 2007. The Coalition monitored for diuron at Unnamed Drain as a part of 2010 MPM in January and February, which will be reported in the 2011 Management Plan Updated. There were slightly more applications, pounds applied, and acres treated in 2009 relative to 2008, particularly in March and December, but these levels are low when compared to 2006 and 2007 (Table III-15, Figure III-4). Alfalfa, walnuts, and grapes receive the most applications (Table III-16).

Table III-15. Number of diuron applications, total pounds applied, and total acres treated by month for January 2006 through December 2009 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Diuron Applications	Pounds Applied	Acres Treated
January, 2006	5	124.6	140
February, 2006	20	841.1	1197.43
March, 2006	1	66.5	80
April, 2006	1	15.0	9.4
May, 2006	2	24.8	46
July, 2006	1	8.9	20
August, 2006	1	29.2	15
October, 2006	6	126.8	171.3
November, 2006	8	503.6	212.9
December, 2006	11	665.8	462
January, 2007	1	13.1	33
February, 2007	10	701.9	1380
March, 2007	2	32.7	20
April, 2007	2	48.4	77
May, 2007	1	3.4	5
November, 2007	6	207.3	141.2
December, 2007	4	336.3	224
January, 2008	1	7.8	10
February, 2008	1	7.8	23
March, 2008	3	41.2	127
April, 2008	1	12.5	6.4
November, 2008	5	174.0	135.4
December, 2008	3	305.1	208
January, 2009	5	66.1	124
February, 2009	1	43.4	22.2
March, 2009	2	157.2	108
November, 2009	6	161.1	124
December, 2009	5	374.6	243

Month/Year	Number of Diuron Applications	Pounds Applied	Acres Treated
Summaries by Year			
2006 Total	56	2406.3	2354.03
2007 Total	26	1343.0	1880.2
2008 Total	16	572.4	524.8
2009 Total	19	802.5	621.2
Total	98	4,321.7	4,759.03

Figure III-4. Pounds of diuron applied within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2006 through 2009. Asterisk (*) denotes months with exceedances.

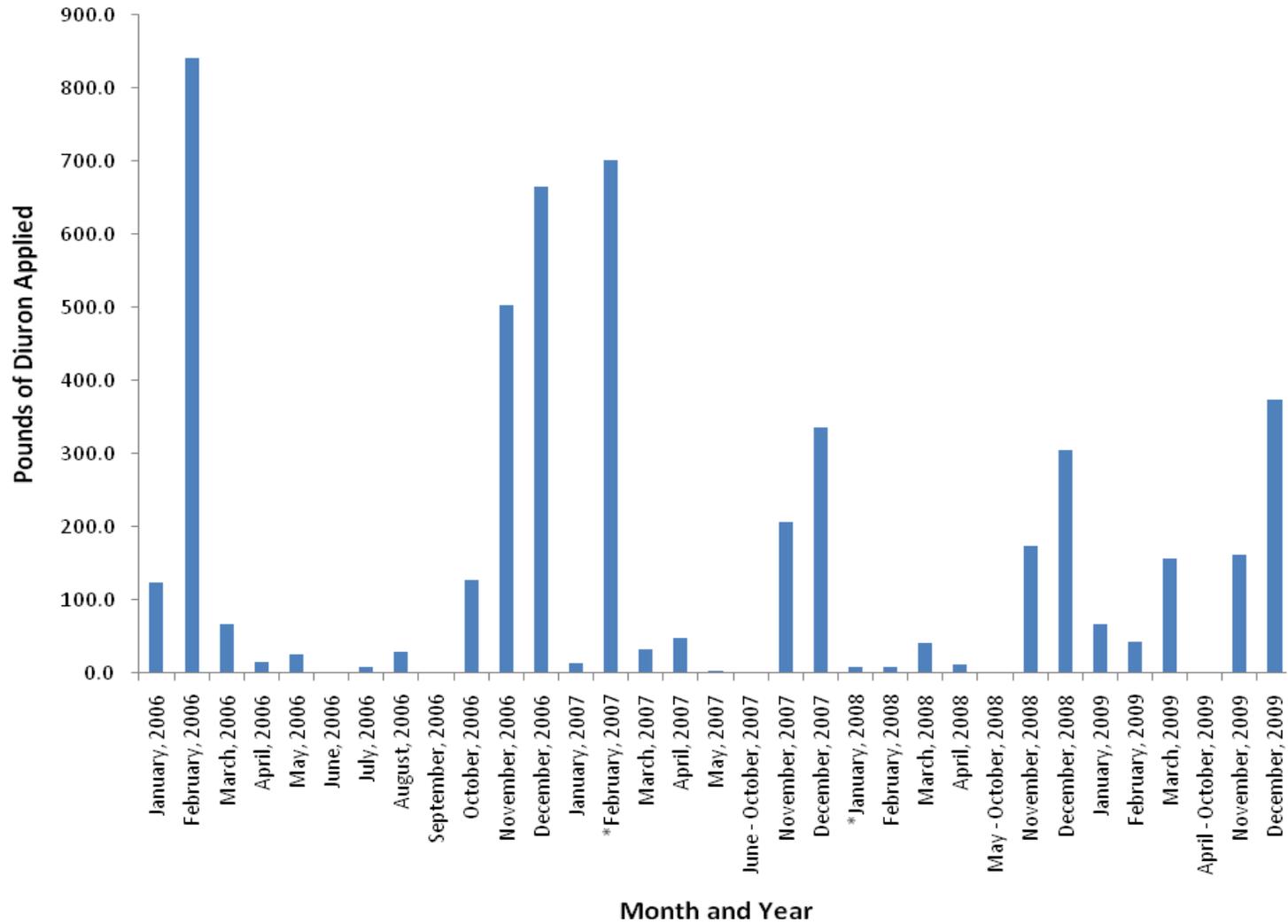


Table III-16. Total pounds active ingredient (AI) for diuron based on PUR data from 2006-2008 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIURON	ALFALFA	DIREX 4L	201.031
		DIURON 4L	144.342
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	1377.257
	APPLE	DIREX 4L	68.356
		DUPONT DIREX 4L HERBICIDE	33.594
	GRAPES	DIREX 4L	66.489
		DIURON 400 HERBICIDE	50.844
		KARMEX XP HERBICIDE	701.688
	GRAPES, WINE	KARMEX DF HERBICIDE	701.920
	PEAR	DIREX 4L	25.031
	UNCUL NON-AG	DIREX 4L	1.956
		DU PONT KROVAR I DF HERBICIDE	150.000
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	DIREX 4L	356.156
	WALNUT	DIREX 4L	158.202
		DIURON 4L	144.342
		DREXEL DIURON 4L HERBICIDE	25.081
		DUPONT DIREX 4L HERBICIDE	7.199
		KARMEX DF HERBICIDE	12.000
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	699.489
		DIREX 80DF	42.000
DIURON 4L HERBICIDE		8.854	
DREXEL DIURON 4L HERBICIDE		55.978	
DUPONT DIREX 4L HERBICIDE		14.205	
KARMEX DF HERBICIDE		54.240	
ALFALFA – Total Pounds Diuron Applied			1722.630
APPLE – Total Pounds Diuron Applied			101.949
GRAPES – Total Pounds Diuron Applied			1520.941
PEAR – Total Pounds Diuron Applied			25.031
UNCULTIVATED NON-AG AREAS – Total Pounds Diuron Applied			508.112
WALNUT – Total Pounds Diuron Applied			1221.588
Total pounds diuron applied (2006 - 2009)			5,100.251

Previous analyses reported by the Coalition in the 2009 Management Plan Update found that only three applications occurred in two sections suggesting the exceedances were a function of movement from one or two parcels. Management of diuron in this watershed has focused on

providing information to the small number of growers with the potential to drain to the creek, which is the management plan strategy outlined under the chlorpyrifos section. The Coalition addressed diuron exceedances by discussing diuron exceedances and management with individual growers relevant to preventing storm and irrigation discharge to waterways. The Coalition will assess the impact of water management practices throughout 2010 and 2011 by following up with growers and continued water monitoring.

Simazine

Simazine has only exceeded the WQTL (4.0 µg/L) twice, once on February 11, 2007 and again on January 23, 2008. Simazine was not monitored as part of 2009 MPM.

Simazine has been applied in this watershed in every month except for June and September, but it is applied primarily in the winter months (Table III-17, Figure III-5). Simazine use increased in 2009 relative to 2008 in number of applications, pounds applied, and acres treated; there was a particularly large spike in usage in November 2009. Simazine is primarily applied to grapes, and walnuts (Table III-18).

Table III-17. Number of simazine applications, total pounds applied, and total acres treated by month for January 2006 through December 2009 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Simazine Applications	Pounds Applied	Acres Treated
January, 2006	7	188.2	234
February, 2006	7	365.2	259.83
March, 2006	3	38.3	127
April, 2006	1	16.9	9.4
May, 2006	2	25.5	46
July, 2006	1	9.0	20
August, 2006	1	27.0	15
October, 2006	4	91.1	86.3
November, 2006	8	363.9	237.9
December, 2006	4	1076.4	976
January, 2007	1	8.0	80
February, 2007	3	96.0	176
March, 2007	3	61.3	40
April, 2007	2	19.8	27
May, 2007	1	3.5	5
October, 2007	1	11.0	28
November, 2007	7	316.7	153.2
December, 2007	6	1243.5	1044.3
January, 2008	4	120.8	173
February, 2008	1	19.6	36
March, 2008	3	45.2	191
December, 2008	8	969.5	396.4
January, 2009	5	58.9	143
February, 2009	6	271.5	288.3
March, 2009	3	37.1	67.36

Month/Year	Number of Simazine Applications	Pounds Applied	Acres Treated
April, 2009	8	342.9	340.04
May, 2009	1	36.4	100
November, 2009	13	1724.1	522.02
Summaries by Year			
2006 Total	38	2201.5	2011.43
2007 Total	24	1759.8	1553.5
2008 Total	16	1155.1	796.4
2009 Total	36	2470.8	1460.72
Total	114	7,587.2	5,822.05

Figure III-5. Pounds of simazine applied within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2006 - 2009. Asterisk (*) denotes months with exceedances.

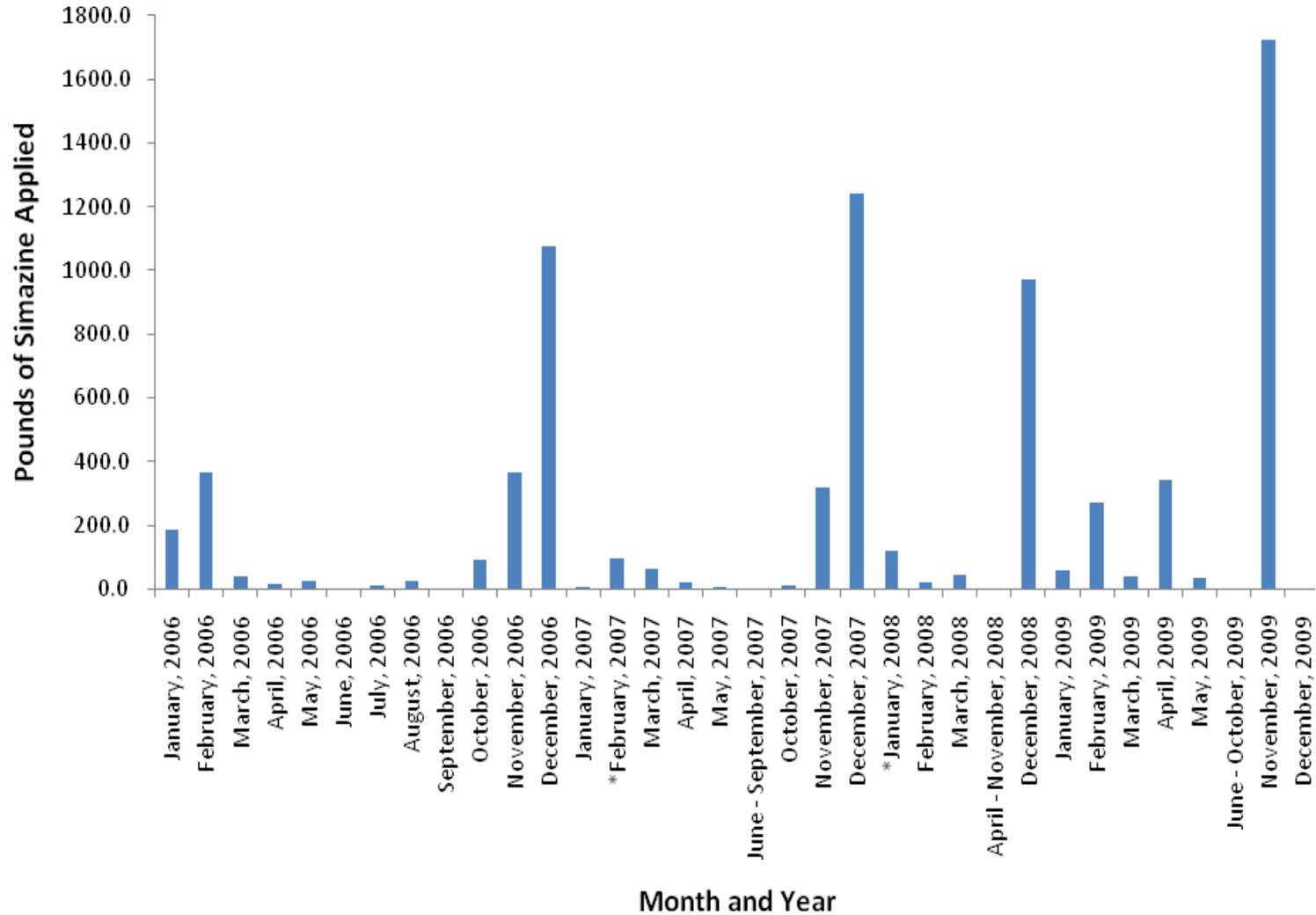


Table III-18. Total pounds active ingredient (AI) for simazine based on PUR data from 2006-2008 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied	
SIMAZINE	ALMOND	DREXEL SIMAZINE 4L	38.776	
		PRINCEP 4L	23.150	
		PRINCEP CALIBER 90 HERBICIDE	109.152	
		SIM-TROL 4L	365.557	
		SIM-TROL 90DF	45.090	
	GRAPES	DREXEL SIMAZINE 4L	54.068	
		PRINCEP 4L	6.963	
		PRINCEP CALIBER 90 HERBICIDE	1256.400	
		SIMAZINE 90DF	106.200	
		SIM-TROL 4L	18.082	
	GRAPES, WINE	PRINCEP 4L	122.073	
		PRINCEP CALIBER 90 HERBICIDE	54.000	
		SIMAZINE 4L HERBICIDE	1286.682	
		SIMAZINE 90DF	1072.800	
	UNCUL NON-AG	SIM-TROL 4L	1343.506	
		DREXEL SIMAZINE 4L	120.152	
		UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	DREXEL SIMAZINE 4L	10.013
		WALNUT	DREXEL SIMAZINE 4L	29.128
	SIMAZINE 90DF		14.850	
	SIM-TROL 4L		548.639	
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	PRINCEP 4L	167.851	
PRINCEP CALIBER 90 HERBICIDE		308.070		
SIMAZINE 90 WATER DISPERSIBLE GRANULAR HERBICIDE		295.560		
SIMAZINE 90DF		16.920		
SIM-TROL 4L		134.814		
SIM-TROL 90DF		38.682		
ALMOND – Total Pounds Simazine Applied			581.725	
GRAPES – Total Pounds Simazine Applied			5320.775	
UNCULTIVATED NON-AG AREAS – Total Pounds Simazine Applied			130.165	
WALNUT – Total Pounds Simazine Applied			1554.513	
Total pounds simazine applied (2006 - 2009)			7,587.178	

Previous analyses reported by the Coalition in the 2009 Management Plan Update suggest that management of simazine in this watershed should focus on providing information to growers with the potential to drain to the creek. The Coalition included simazine in discussions with individual growers; specifically discussing preventing storm and irrigation discharge to

waterways. The Coalition will assess the impact of water management practices throughout 2010 and 2011 by following up with growers and continued water monitoring.

Priority D Constituents

The following priority D constituents have been listed under the Unnamed Drain to Lone Tree Creek Management Plan: *Ceriodaphnia dubia* and *Selenastrum capricornutum* water column toxicity and sediment toxicity to *Hyalella*.

***Ceriodaphnia* toxicity**

Toxicity to *Ceriodaphnia* was experienced during September 2009 MPM. In 2008, toxicity was experienced once in January and twice in September. Prior to 2008 monitoring, there was only one occurrence of toxicity to *Ceriodaphnia* during February 2007. All toxicity, included the 2009 occurrence, coincided with exceedances of the chlorpyrifos WQTL in the same month. The Coalition's strategy to address toxicity to *Ceriodaphnia* has been to focus on chlorpyrifos exceedances. If chlorpyrifos can be prevented from entering the waterway, then toxicity may be reduced or eliminated.

***Selenastrum* toxicity**

Selenastrum toxicity did not occur during May 2009 MPM. It occurred once during May 2008 and was associated with an exceedance of copper. *Selenastrum* toxicity had also occurred four times during February and March 2007 sampling. The Coalition believes that management of copper and herbicides such as diuron and simazine will eliminate the toxicity to algae.

***Hyalella* toxicity**

Hyalella toxicity occurred in August 2007 and in March, April and August of 2008. The Coalition has begun to conduct management plan sampling for sediment toxicities. As of 2009, the Coalition now tests for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. Management Plan Monitoring will occur for this site in 2010 or 2011.

Priority E Constituents

The following priority E constituents have been listed under the Unnamed Drain to Lone Tree Creek Management Plan: DO, *E. coli*, SC, TDS, and lead. The Coalition had one exceedance of DO during August 2009 MPM. The Coalition will not actively manage these constituents until the Coalition and Regional Board determine that they are higher priority.

Evaluation

This subwatershed is one of the first three priority site subwatersheds within the SJCDWQC and therefore the Coalition has focused its resources on identifying the sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals.

The Coalition's strategy for the Unnamed Drain to Lone Tree Creek subwatershed has been to target a large portion of growers applying products containing or related to the highest priority constituents (chlorpyrifos, copper, diuron, and simazine). Outreach includes grower notification, management practice education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practice implementations and assess future planned implementations have been completed by 80% of targeted growers. The Coalition will continue to collect surveys from targeted growers. These results will be assessed, and the Coalition is in the process of planning the final stages of outreach including re-contacting growers to identify newly implemented practices.

Number of applications, pounds applied, and acres treated with chlorpyrifos and copper have decreased overall since 2006, which may be a result of educating growers about alternative products. Despite this, chlorpyrifos still exceeded the WQTL in Unnamed Drain during May, July, and September 2009. Management Plan Monitoring in 2010 will indicate if a change in management practices as a result of individual contacts has resulted in long-term improvements to downstream water quality.

IV. GRANT LINE CANAL @ CLIFTON COURT RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper

Priority D

- *Hyalella azteca* sediment toxicity

Priority E

- Arsenic
- DDE
- Dissolved Oxygen
- *E. coli*
- Lead
- pH
- Specific Conductivity
- Total Dissolved Solids
- *Selenastrum capricornutum* water column toxicity

Description of Grant Line Canal @ Clifton Court Rd Site Subwatershed

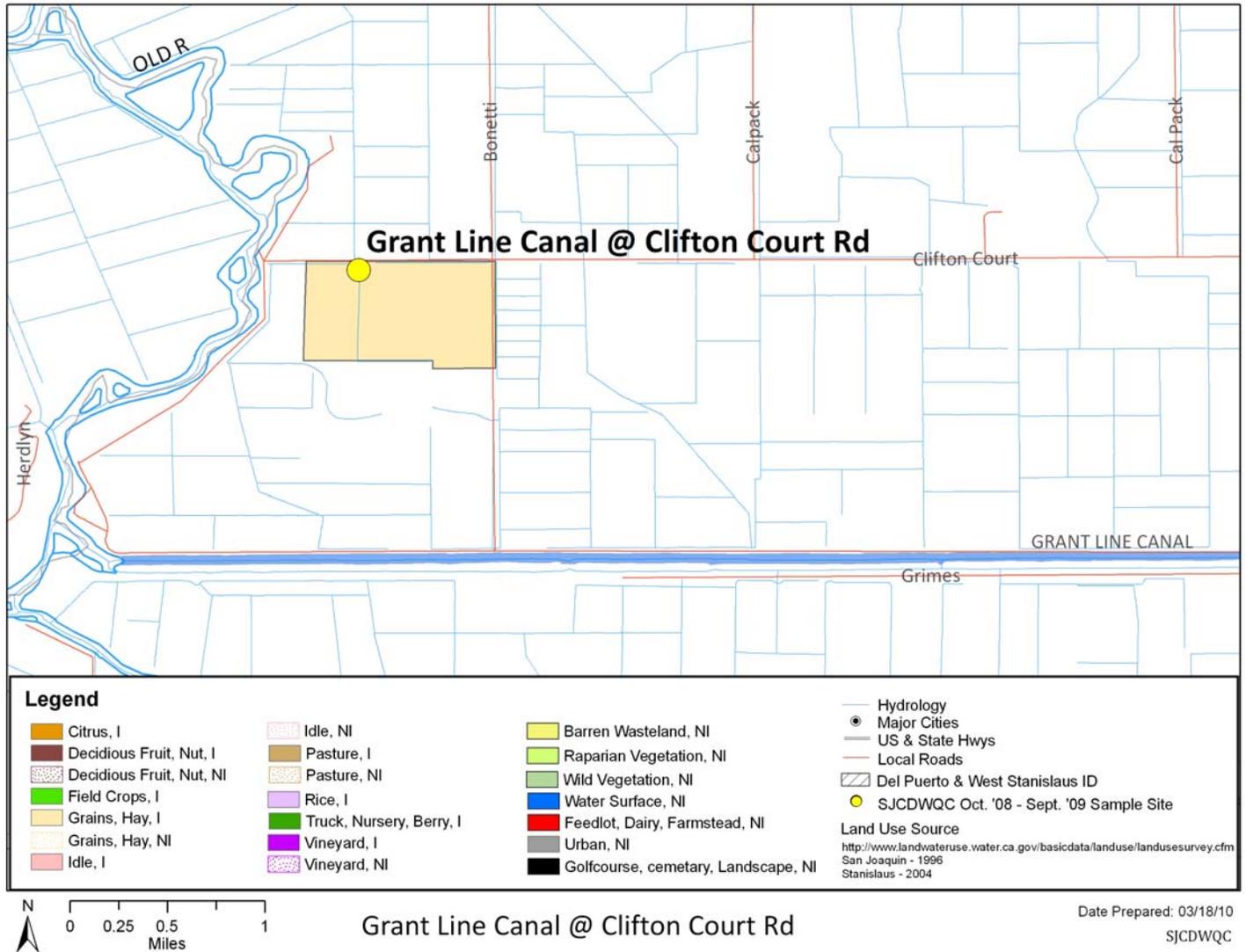
Grant Line @ Clifton Court Road (259 irrigated acres) – This site is located on the southwest section of Union Island. Table IV-1 includes the station name, station code and target latitude/longitudes for the site sampled within this subwatershed. The site is west of the Grant Line Canal @ Calpack Rd site, immediately south of Clifton Court road, and drains fields east and south. The crops are primarily alfalfa, field crops, tomatoes and grain. Figure IV-1 illustrates the land use within this site subwatershed area.

The Grant Line Canal (GLC) is located in the Bay-Delta tidal prism and receives water from east and west inputs. Source water of the GLC depends on delta tides, the natural flows of large water bodies such as the San Joaquin River (SJR), and the operation of agriculture barriers.

Table IV-1. Coordinates of the Grant Line canal @ Clifton Court Rd site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Grant Line Canal @ Clifton Court Rd	544XGLCAA	37.8414	-121.5288

Figure IV-1. Site subwatershed map of land use for sample site at Grant Line Canal @ Clifton Court Rd.



Subwatershed Monitoring History

Monitoring at Grant Line Canal @ Clifton Court Rd began in the storm season of 2005 and continued to be monitored throughout the storm and irrigation seasons from 2006 through 2008 (Table IV-2). Starting in October 2008, Grant Line Canal @ Clifton Court Rd was removed from the monitoring schedule and became an Assessment site under the new Monitoring Reporting Program Plan (MRPP). It is scheduled to be monitored for all Assessment constituents in 2026-2027. The constituents sampled at this location from 2005-2008 are listed in Table IV-3.

Management Plan Monitoring occurred at Grant Line Canal @ Clifton Court Rd in 2007 for copper (Table IV-4). The site subwatershed was monitored twice a month for copper in 2007 during June, July and September.

The GLC is not considered impaired in the proposed 2008 Basin Plan, however the Old River section that runs from the SJR to the Delta Mendota Canal, parallel to the Canal, is 303d listed and is impaired as a result of low DO due to hydromodification. The export waters of the Delta are 303d listed for chlorpyrifos, low DO and salinity. This includes the Delta Mendota Canal and the California Aqueduct, both of which receive water from GLC. The source for these impairments is listed as unknown.

Table IV-2. Grant Line Canal @ Clifton Court Rd sampling events per season and year.

	2004		2005		2006		2007		2008			2009		
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA
Events Not Sampled	NA	0	0	0	0	0	0	0	0	NA	NA	NA	NA	NA
Total	NA	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA

NA - Not applicable. This site was not sampled during this season/year.

Table IV-3. Number of analyses performed per analyte in each sampling season and year for the Grant Line Canal @ Clifton Court Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
Field and Physical Parameters										
NA	pH	1	5	3	5	3	9	3	8	
NA	Electrical Conductivity	2	5	3	5	3	9	3	8	
NA	Dissolved Oxygen	2	5	3	4	3	9	3	8	
EPA 160.1	Total Dissolved Solids	2	5	2	5	2	6	1	6	
EPA 180.1	Turbidity	2	5	2	5	2	6	1	6	
SM 9223 B	E. coli	2	5	2	5	2	7	1	6	
EPA 110.2	Color	2	5	2	5	2	6	1	6	
EPA 415.1	Total Organic Carbon	2	5	2	5	2	6	1	6	
EPA 405.1	Biological Oxygen Demand				1	2	2			
Carbamates										
EPA 8321A	Aldicarb				5	2	6	1	6	
EPA 8321A	Carbaryl				5	2	6	1	6	
EPA 8321A	Carbofuran				5	2	6	1	6	
EPA 8321A	Methiocarb				5	2	6	1	6	
EPA 8321A	Methomyl				5	2	6	1	6	
EPA 8321A	Oxamyl				5	2	6	1	6	
Organochlorines										
EPA 8081A	DDD				5	2	6	1	6	
EPA 8081A	DDE				5	2	6	1	6	
EPA 8081A	DDT				5	2	6	1	6	
EPA 8081A	Dicofol				5	2	6	1	6	
EPA 8081A	Dieldrin				5	2	6	1	6	
EPA 8081A	Endrin				5	2	6	1	6	
EPA 8081A	Methoxychlor				5	2	6	1	6	
Organophosphates										

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
EPA 8141A	Azinphos methyl				5	2	6	1	6	
EPA 8141A	Chlorpyrifos	2	5	2	5	2	6	1	6	
EPA 8141A	Diazinon	2	5	2	5	2	6	1	6	
EPA 8141A	Dimethoate				5	2	6	1	6	
EPA 8141A	Disulfoton				5	2	6	1	6	
EPA 8141A	Malathion				5	2	6	1	6	
EPA 8141A	Methamidophos				5	2	6	1	6	
EPA 8141A	Methidathion				5	2	6	1	6	
EPA 8141A	Parathion, Methyl				5	2	6	1	6	
EPA 8141A	Phorate				5	2	6	1	6	
EPA 8141A	Phosmet				5	2	6	1	6	
Pyrethroids										
EPA 8081A	Bifenthrin		1	2	5	2	6	1	6	
EPA 8081A	Cypermethrin	2	5	2	5	2	6	1	6	
EPA 8081A	Cyhalothrin, lambda	2	5	2	5	2	6	1	6	
EPA 8081A	Permethrin	2	5	2	5	2	6	1	6	
EPA 8081A	Cyfluthrin		1	2	5	2	6	1	6	
EPA 8081A	Esfenvalerate/ Fenvalerate	2	5	2	5	2	6	1	6	
Triazines										
EPA 619	Atrazine				5	2	6	1	6	
EPA 619	Cyanazine				5	2	6	1	6	
EPA 8321A	Diuron				5	2	6	1	6	
EPA 574M	Glyphosate				5	2	6	1	6	
EPA 8321A	Linuron				5	2	6	1	6	
EPA 8141A	Molinate				5	2	6	1	6	
EPA 549.2M	Paraquat dichloride				5	2	6	1	6	
EPA 619	Simazine				5	2	6	1	6	

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
EPA 8141A	Thiobencarb				5	2	6	1	6	
Metals (Total)										
EPA 200.8	Arsenic				5	2	6	1	6	
EPA 200.8	Boron				5	2	6	1	6	
EPA 200.8	Cadmium				5	2	6	1	6	
EPA 200.8	Copper				5	2	8	1	6	
EPA 200.8	Lead				5	2	6	1	6	
EPA 200.8	Nickel				5	2	6	1	6	
EPA 200.8	Selenium				5	2	2	1	6	
EPA 200.8	Zinc				5	2	6	1	6	
Nutrients										
EPA 300.0	Nitrate as NO3				5	2	6	1	6	
EPA 354.1	Nitrite as Nitrogen				5	2	6	1	6	
EPA 350.2	Ammonia				5	2	6	1	6	
SM 2340 C	Hardness as CaCO3				5	2	8	1	6	
EPA 365.2	Phosphate as P				5	2	6	1	6	
EPA 365.2	Orthophosphate				5	2	6	1	6	
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	1	6	
Toxicity										
EPA 821-02-012	Ceriodaphnia dubia	2	5	2	5	2	7	2	6	
EPA 821-02-012	Pimephales promelas	2	5	2	5	2	7	1	6	
EPA 821-02-013	Selenastrum capricornutum	2	5	2	5	2	7	2	7	
EPA 600/R-99-064	Hyalella azteca		3	1	1	2	1	1	1	

*Site not sampled during the 2008 fall season.

Table IV-4. Grant Line Canal @ Clifton Court Rd site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Copper
Grant Line Canal @ Clifton Court Rd	20-Jun-07	A	X
Grant Line Canal @ Clifton Court Rd	30-Jul-07	A	X
Grant Line Canal @ Clifton Court Rd	25-Sep-07	A	X

Exceedance History

During Coalition monitoring, exceedances of WQTL for field and physical parameters, *E. coli*, metals, pesticides, and sediment toxicity have occurred at Grant Line Canal @ Clifton Court Rd. During all four years of ambient water monitoring sampling events have resulted in exceedances of the WQTLs for DO (23), pH (7), SC (19), *E. coli* (19), TDS (16), ammonia (1), arsenic (10), copper (6), lead (3), carbofuran (1), chlorpyrifos (5), DDE (2), DDT (1), dimethoate (1), one water column toxicity to *Ceriodaphnia*, two to *Selenastrum*, and two instances of sediment toxicity to *Hyalella azteca*.

All exceedances are listed in Table IV-5 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table IV-5 and is determined using the SJCDWQC Management Plan prioritization process flow chart (Figure 3). The highest priority constituents for Grant Line Canal @ Clifton Court Rd subwatershed are chlorpyrifos (A/B) and copper (C).

Table IV-5. All exceedances experienced in samples collected from locations within the Grant Line Canal @ Clifton Court Rd site subwatershed between February 2005 and September 2008 (sorted by season and date). If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, 700 µS/cm	<i>E. coli</i> , 235 MPN/100 mL	Dissolved Solids, 450 mg/L	Ammonia, 1.5 mg/L	Arsenic, 10 µg/L	Copper Total, µg/L	Lead Total, µg/L	Carbofuran, 0 µg/L	Chlorpyrifos, 0.015 µg/L	DDE (p,p'), 0.00059 µg/L	DDT (p,p'), 0.00059 µg/L	Dimethoate ¹ , 1 µg/L	<i>C. dubia</i> , Survival (%)	<i>H. azteca</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count
Grant Line Canal @ Clifton Court Rd	Storm	2/16/2005	5.3		1743	240	1200												
Grant Line Canal @ Clifton Court Rd	Storm	3/21/2005	3.8		1715	240	1100						0.02						
Grant Line Canal @ Clifton Court Rd	Irrigation	5/17/2005			801		550												
Grant Line Canal @ Clifton Court Rd	Irrigation	6/21/2005	5.4																
Grant Line Canal @ Clifton Court Rd	Irrigation	7/19/2005	6.4			1600													
Grant Line Canal @ Clifton Court Rd	Irrigation	8/16/2005	4.7			1600													
Grant Line Canal @ Clifton Court Rd	Irrigation	9/20/2005	3.8															8.8	
Grant Line Canal @ Clifton Court Rd	Storm	2/27/2006				500													
Grant Line Canal @ Clifton Court Rd	Storm	3/15/2006				500													
Grant Line Canal @ Clifton Court Rd	Storm	4/27/2006	1.1	6.11	1214													91.25	
Grant Line Canal @ Clifton Court Rd	Irrigation	5/16/2006		6.48		2400													
Grant Line Canal @ Clifton Court Rd	Irrigation	6/20/2006	6.36			550	530		12	52 (9)	15 (3.02)								
Grant Line Canal @ Clifton Court Rd	Irrigation	7/18/2006	3.6			1600		1.8		31 (10.9)	7.2 (4.01)					11			
Grant Line Canal @ Clifton Court Rd	Irrigation	8/15/2006	2.5	6.42		920													
Grant Line Canal @ Clifton Court Rd	Irrigation	9/19/2006	2.1	5.99	814	360	600		35	100 (27.9)	35 (16.25)			0.014					
Grant Line Canal @ Clifton Court Rd	Storm	2/11/2007			1204	240	740						0.08						
Grant Line Canal @ Clifton Court Rd	Storm	2/28/2007		6.37	1099		700						0.018	0.008	0.01				
Grant Line Canal @ Clifton Court Rd	Storm	3/7/2007	4.21	6.3															
Grant Line Canal @ Clifton Court Rd	Irrigation	4/11/2007	3.56				480					0.09							

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, 700 µS/cm	E. coli, 235 MPN/100 mL	Dissolved Solids, 450 mg/L	Ammonia, 1.5 mg/L	Arsenic, 10 µg/L	Copper Total, µg/L	Lead Total, µg/L	Carbofuran, 0 µg/L	Chlorpyrifos, 0.015 µg/L	DDE (p,p'), 0.00059 µg/L	DDT (p,p'), 0.00059 µg/L	Dimethoate ¹ , 1 µg/L	C. dubia, Survival (%)	H. azteca, Survival (%)	S. capricornutum, Total Cell Count
Grant Line Canal @ Clifton Court Rd	Irrigation	5/22/2007	5.77						20	24 (19)									
Grant Line Canal @ Clifton Court Rd	Irrigation	6/12/2007	4.09			2400													
Grant Line Canal @ Clifton Court Rd	Irrigation	6/20/2007	4		1011														
Grant Line Canal @ Clifton Court Rd	Irrigation	7/10/2007	0.14			2400			11	17 (14.7)									
Grant Line Canal @ Clifton Court Rd	Irrigation	8/7/2007			997	2400	590		14										
Grant Line Canal @ Clifton Court Rd	Irrigation	8/9/2007			810														
Grant Line Canal @ Clifton Court Rd	Irrigation	9/4/2007			838	1700	550		14				0.13						
Grant Line Canal @ Clifton Court Rd	Storm	1/23/2008	4.33		1483		1100						0.14				0		283081
Grant Line Canal @ Clifton Court Rd	Storm	1/30/2008	3.2		1625														
Grant Line Canal @ Clifton Court Rd	Storm	3/18/2008	5.97		1759														
Grant Line Canal @ Clifton Court Rd	Irrigation	4/15/2008	4.82		763	2000	490												
Grant Line Canal @ Clifton Court Rd	Irrigation	5/13/2008			821	260	880		17										87691
Grant Line Canal @ Clifton Court Rd	Irrigation	5/21/2008	1.15																
Grant Line Canal @ Clifton Court Rd	Irrigation	6/10/2008	4.24		892	440	650												
Grant Line Canal @ Clifton Court Rd	Irrigation	7/15/2008			879		590		28										
Grant Line Canal @ Clifton Court Rd	Irrigation	8/12/2008							12	28 (18)									
Grant Line Canal @ Clifton Court Rd	Irrigation	9/16/2008		8.61	1099		620		14										
Constituent Priority			E	E	E	E	E	NP	E	C	E	NP	A/B	E	NP	NP	NP	D	E

NP – Not prioritized; fewer than two exceedances for this constituent at this site within three years and currently no TMDL for constituent.

2007 and 2008 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table IV-6 for copper for 2007 through 2008. Although there was no upstream monitoring for Grant Line Canal @ Clifton Court Rd during 2008, normal monitoring occurred and the results are used to assess copper exceedances and are included in Table IV-6.

2007

In 2007, Grant Line Canal @ Clifton Court Rd was monitored monthly for copper from April through September plus additional monitoring conducted in June and September for copper. The copper WQTL was exceeded in samples collected from in May and July during normal monitoring events, but the amount of copper detected in MPM samples of the same months was not above the WQTL (Table IV-6). All other samples had detectable amounts of copper except the additional MPM sample collected in July (Table IV-6).

2008

No upstream location was monitored as a part of MPM at Grant Line Canal @ Clifton Court Rd. Normal monitoring occurred at the site during 2008, and copper was detected in all samples collected for the irrigation season. The copper WQTL was exceeded in the sample collected during August (Table IV-6).

2009

Grant Line Canal @ Clifton Court Rd was not scheduled for 2009 MPM and was neither a Core nor Assessment Monitoring Site in 2009.

The Coalition plans to conduct MPM at Grant Line Canal @ Clifton Court Rd during the irrigation season of 2010 for copper, chlorpyrifos, *Selenastrum* toxicity, and *Hyalella* toxicity. Management Plan Monitoring during January, February, and March of 2011 is scheduled for chlorpyrifos, *Selenastrum* toxicity, and *Hyalella* toxicity.

Table IV-6. Grant Line Canal @ Clifton Court Rd site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for copper, where 'A' indicates additional MPM (2007). Exceedance values in bold.

Month:	April	May	June	July	August	September	
2007 NM (@ Clifton Court Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Copper (µg/L)	5.5	24	10	17	10	8.5
2007 MPM A (@ Clifton Court Rd)	Date	NA	NA	6/20/07	7/30/07	NA	9/25/07
	Copper (µg/L)	NA	NA	8.5	<0.01	NA	3.7
2008 NM (@ Clifton Court Rd)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Copper (µg/L)	6.5	7.9	5.9	6.2	28	5.9

NA - Not applicable; this site was not sampled during this month for particular consistent.

Load Calculations

Loads have been calculated for the chlorpyrifos detections based on the following formula (Table IV-7):

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L} \times \text{Concentration (milligram/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table IV-7. Grant Line Canal @ Clifton Court Rd. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured (sorted by analyte, site and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration $\mu\text{g/L}$	Loading Rate $\mu\text{g/sec}$
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	21-Mar-05	0	0.02	0
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	11-Feb-07	0	0.08	0
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	28-Feb-07	0	0.018	0
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	23-Jan-08	0	0.14	0
Grant Line Canal @ Clifton Court Rd	Copper	16-May-06	1.47	9	374.63
Grant Line Canal @ Clifton Court Rd	Copper	20-Jun-06	3.58	52	5271.49
Grant Line Canal @ Clifton Court Rd	Copper	18-Jul-06	0	31	0
Grant Line Canal @ Clifton Court Rd	Copper	15-Aug-06	0	11	0
Grant Line Canal @ Clifton Court Rd	Copper	19-Sep-06	0	100	0
Grant Line Canal @ Clifton Court Rd	Copper	11-Feb-07	0	4.7	0
Grant Line Canal @ Clifton Court Rd	Copper	28-Feb-07	0	6.7	0
Grant Line Canal @ Clifton Court Rd*	Copper	22-May-07	0	26	0
Grant Line Canal @ Clifton Court Rd	Copper	22-May-07	0	24	0
Grant Line Canal @ Clifton Court Rd	Copper	12-Jun-07	0	10	0
Grant Line Canal @ Clifton Court Rd	Copper	20-Jun-07	0	8.5	0
Grant Line Canal @ Clifton Court Rd	Copper	7-Aug-07	0	10	0
Grant Line Canal @ Clifton Court Rd	Copper	25-Sep-07	0	3.7	0
Grant Line Canal @ Clifton Court Rd	Copper	23-Jan-08	0	7.3	0
Grant Line Canal @ Clifton Court Rd	Copper	15-Apr-08	0	6.5	0
Grant Line Canal @ Clifton Court Rd	Copper	13-May-08	0	7.9	0
Grant Line Canal @ Clifton Court Rd	Copper	10-Jun-08	0	5.9	0
Grant Line Canal @ Clifton Court Rd	Copper	15-Jul-08	0	6.2	0
Grant Line Canal @ Clifton Court Rd	Copper	12-Aug-08	0	28	0
Grant Line Canal @ Clifton Court Rd	Copper	16-Sep-08	0	5.9	0

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent listed under the Management Plan for the Grant Line Canal @ Clifton Court Rd site subwatershed.

Chlorpyrifos

Chlorpyrifos concentrations in water samples have exceeded the WQTL of 0.015µg/L five times in this subwatershed from 2005 through 2008. Grant Line Canal @ Clifton Court Rd was not sampled during 2009 monitoring.

The greatest amount of chlorpyrifos use occurred in 2006 (2,470.6 lbs) with the lowest use occurring in 2007 (283.2 lbs). Overall, the amount of chlorpyrifos applied within this subwatershed decreased since 2005, with no applications reported in 2008 and 2009 (Table IV-8, Figure IV-2). In 2004, the greatest amount of chlorpyrifos use occurred in August whereas in 2005 and 2007, the greatest use occurred in July, and in 2006 during October (Table IV-8, Figure IV-2). Not all exceedances occurred during months of the greatest amount of use, and some exceedances occurred in months with no applications that month and several months prior (Figure IV-2).

Chlorpyrifos is only applied to alfalfa and asparagus in this subwatershed, with alfalfa receiving the majority of applications and pounds applied (3,813.384 lbs, Table IV-9). The most common product containing chlorpyrifos used within this watershed was Lorsban (Table IV-9).

Table IV-8. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for January 2005 through December 2009 in the Grant Line Canal @ Clifton Court Rd subwatershed. No chlorpyrifos applications were reported in 2008 and 2009.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
March, 2005	12	560	549.2
July, 2005	9	937.2	746
August, 2005	4	719.8	275.7
September, 2005	2	433	198
January, 2006	1	56.9	34.7
February, 2006	1	38.9	22
March, 2006	4	627.2	389.5
April, 2006	6	280.3	380
August, 2006	1	291.7	122
September, 2006	2	262.9	141.2
October, 2006	7	791.3	341
November, 2006	1	65.6	40

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
December, 2006	1	55.8	34
July, 2007	6	283.2	282
Summaries by Year			
2005 Total	27	2650	1768.9
2006 Total	24	2470.6	1504.4
2007 Total	6	283.2	282
Total	57	5,403.8	3,555.3

Figure IV-2. Pounds of chlorpyrifos applied within the Grant Line Canal @ Clifton Court Rd site subwatershed by month for 2005 – 2009 (no chlorpyrifos applications were reported in 2008-2009). Asterisk (*) denotes months with exceedances.

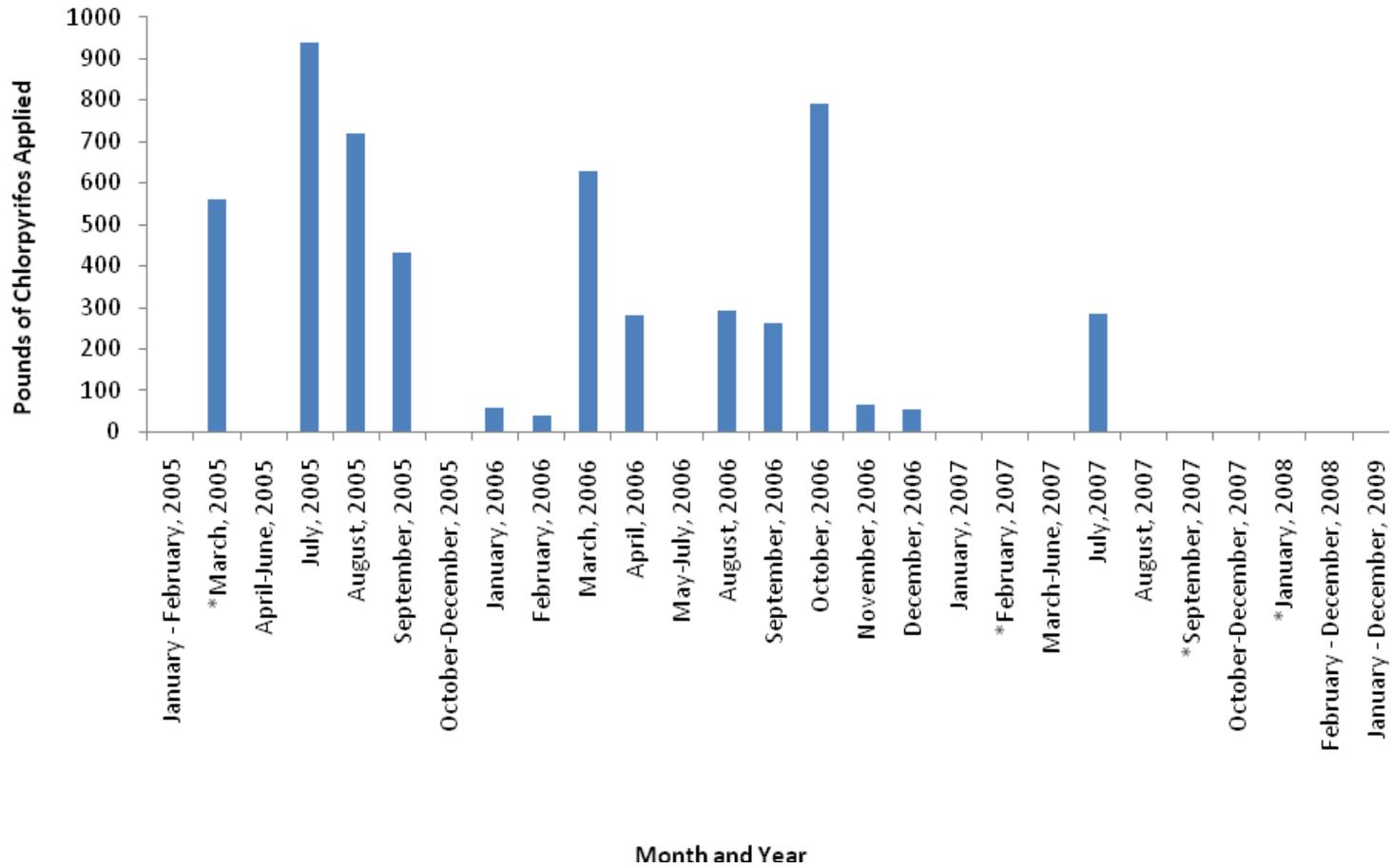


Table IV-9. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2005-2009 within the Grant Line Canal @ Clifton Court Rd subwatershed. No chlorpyrifos applications were reported in 2008-2009.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	1652.389
		LORSBAN 4E-HF	2160.996
	ASPARAGUS	LORSBAN 4E INSECTICIDE	283.240
	ASPARAGUS (SPEARS, FERNS, ETC.)	LORSBAN 4E INSECTICIDE	633.997
		LORSBAN 4E-HF	673.224
ALFALFA - Total Pounds Chlorpyrifos Applied			3813.384
ASPARAGUS - Total Pounds Chlorpyrifos Applied			1590.460
Total pounds chlorpyrifos applied (2005 - 2009)			5,403.845

No use of chlorpyrifos has been reported in this subwatershed since 2007. Based on results from general management practice surveys, approximately 75% of the member acreage either utilizes recirculation and/or tail water return systems or report no runoff. However, an exceedance of the WQTL for chlorpyrifos occurred in January 2008 (see the SJCDWQC General Survey Summary Report submitted on December 30, 2008 for details on the management practices within this subwatershed). The Coalition anticipates that targeted outreach will increase the use of these practices and other irrigation water management practices within Grant Line Canal @ Clifton Court Rd.

As part of the first year of the Management Plan process, individual surveys are completed by targeted growers. Because of the relatively small number of members in the Grant Line Canal @ Clifton Court Rd site subwatershed and its similarity in issues and crop type to the Grant Line Canal near Calpack Rd site subwatershed (see next section), these subwatersheds are being targeted together. The Coalition sent out mailings to the four targeted growers from both subwatersheds in early January to invite members and their associated permittees to a meeting on January 28, 2010 (two members from either subwatershed). The mailing included a meeting agenda and individual management practice survey to be filled out during the meeting. At the meeting, Coalition representatives presented an overview of the Coalition's purpose, current water quality issues, and status of the Irrigated Lands Regulatory Program (ILRP). Various management practices that are effective in reducing runoff of water and sediment that contribute to high priority exceedances, specifically chlorpyrifos and copper, were discussed. The attendees at the meeting grow mostly alfalfa or other row crops. Therefore, the Coalition discussed alfalfa weevil management, alfalfa worm management and alfalfa aphid management as well as switching to products other than those containing chlorpyrifos as another option for reducing/eliminating the presence of chlorpyrifos in water bodies that are pumped directly into GLC. Focus was also on drift issues and concerns including minimizing spray drift by spraying in favorable conditions, using appropriate nozzle sizes and spray pressures, and maintaining low speeds when applying by ground (6 mph). Although the meeting focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including

copper exceedances, *S. capricornutum* and sediment toxicity, and exceedances of *E. coli*, pH, DO, SC, TDS, DDE, arsenic, and lead. Surveys were completed for three members that document the members' current practices and indicate which recommended practices growers anticipated implementing in the upcoming year (one survey for Grant Line Canal @ Clifton Court Rd and two surveys for Grant Line Canal near Calpack Rd). The Coalition is in the process of compiling and assessing the surveys.

The Coalition contacted four growers within the two Grant Line Canal subwatersheds and three members have completed and returned surveys. The Coalition plans to follow up with the one outstanding member with phone calls and/or additional mailings.

Because these meetings occurred recently, the Coalition is hopeful that members will begin to implement recommended management practices during the spring and summer of 2010. However the Coalition understands that limited grower resources and other factors may delay implementation. Additionally, implementation of long term structural management practices will most likely take longer than two years to put into operation and will require additional tracking to document their implementation. Growers will be contacted in November 2010 to determine what practices were implemented during the 2010 irrigation year. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year. Not all growers will need to be contacted during the second fall. To obtain the information on practices implemented since the interview/meeting, the Coalition anticipates either conducting phone calls or sending out a brief letter that includes a survey for the grower to complete.

To evaluate the implementation of new management practices, the Coalition will monitor at Grant Line Canal @ Clifton Court Rd during 2010 and 2011. Depending on when additional management practices are implemented, the Coalition may monitor through 2012 to evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or are have the potential for spray drift will affect downstream water quality by the end of the second year as a high priority site subwatershed.

Priority C constituents

Copper

Copper has exceeded the hardness based WQTL six times in this subwatershed from 2004 through 2008 based on results from total copper analysis. Overall, the amount of copper applied within the subwatershed has decreased since 2006, with no applications reported in 2009 (Table IV-10, Figure IV-3). Copper applications have only occurred in March in this subwatershed, yet exceedances have occurred during irrigation months, often in mid-late summer (Table IV-10, Figure IV-3).

The Coalition also used PUR data to assess which crops receive the most applications of copper. Copper is only applied to alfalfa in this subwatershed (Table IV-11). The most common product containing copper used in this subwatershed was Kocide (Table IV-11).

Table IV-10. Number of copper applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Grant Line Canal @ Clifton Court Rd site subwatershed. If a month is not included in the table, no applications were made. No copper applications were reported in 2005 and 2009.

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
March, 2006	5	817.5	438.5
March, 2007	4	537.3	437
March, 2008	2	181.6	225
Summaries by Year			
2006 Total	5	817.5	438.5
2007 Total	4	537.3	437
2008 Total	2	181.6	225
Total	11	1,536.3	1,100.5

Figure IV-3. Pounds of copper applied within the Grant Line canal @ Clifton Court Rd site subwatershed by month for 2005 – 2009. No copper applications were reported in 2005 or 2009. Asterisk (*) denotes months with exceedances.

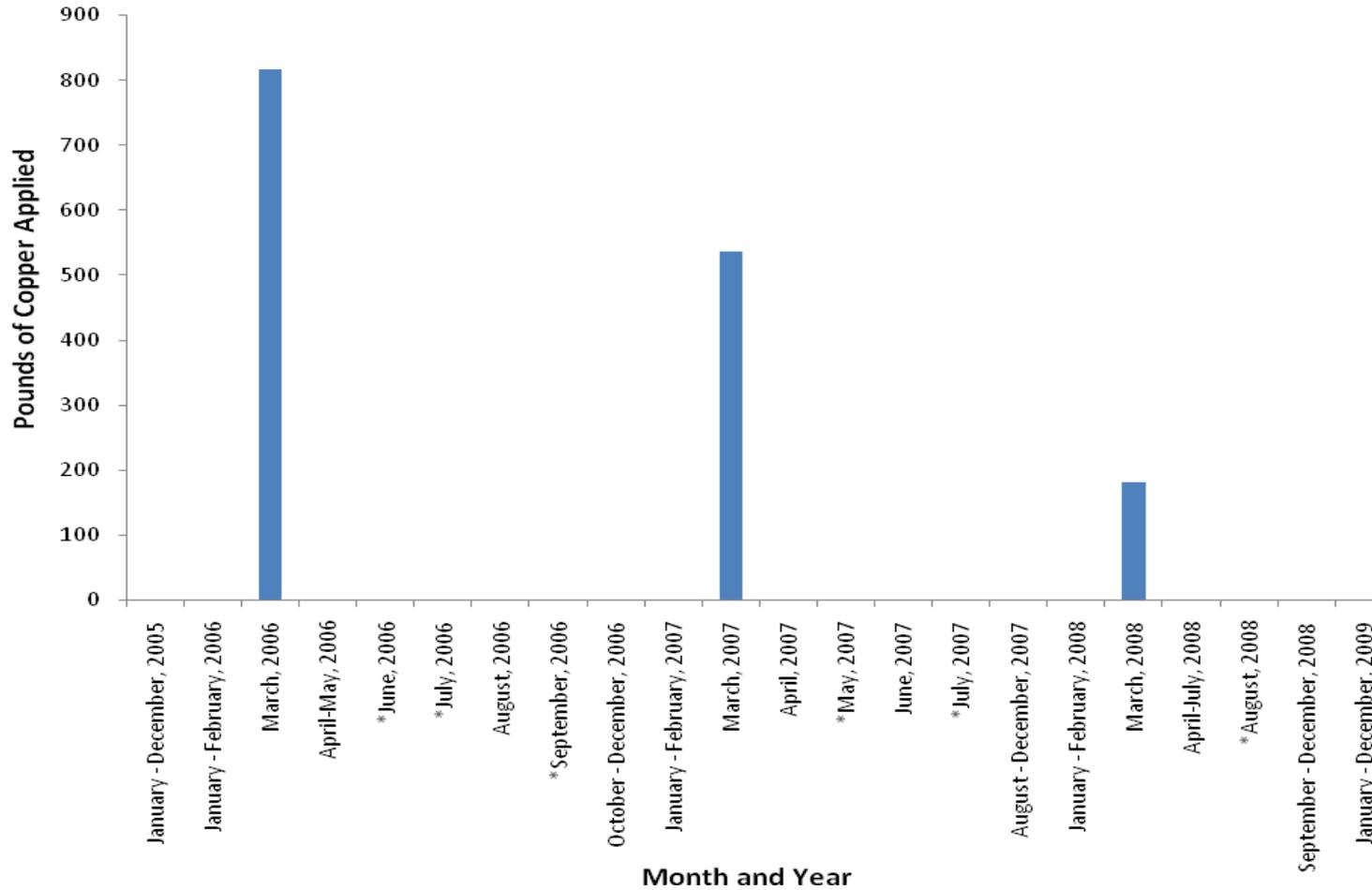


Table IV-11. Total pounds active ingredient (AI) applied for copper based on PUR data from 2005-2009 within the Grant Line Canal @ Clifton Court Rd subwatershed. No copper applications were reported in 2005 and 2009.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA	KOCIDE DF	537.250
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 101	817.456
		KOCIDE 2000	181.575
ALFALFA – Total Pounds Copper Applied			1536.281
Total pounds copper applied (2005- 2009)			1,536.281

The Coalition will continue with its management plan strategy outlined above under the chlorpyrifos outreach section when conducting individual contacts. Alfalfa operators will be advised to consider irrigation tail water retention to prevent copper from entering the waterway with runoff. Storm runoff management relevant to copper applications will also be discussed to prevent against winter exceedances. Individual contacts occurring within this subwatershed are described under the chlorpyrifos outreach section above and have included discussions of copper exceedances and the above management practices.

Priority D Constituents

Priority D constituents under the Grant Line Canal @ Clifton Court Rd Management Plan include arsenic and sediment toxicity *H. azteca*.

Hyaella toxicity

Hyaella toxicity occurred in September 2005 and April 2006. The Coalition has initiated management plan sampling for sediment toxicity. As of 2009, the Coalition now tests for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. However, toxicity was not experienced during 2007 and 2008 sampling, and MPM is not scheduled for this site in 2010 or 2011.

Priority E Constituents

Priority E constituents under the Grant Line Canal @ Clifton Court Rd Management Plan include DO, pH, SC, TDS, *E. coli*, DDE, arsenic, lead and water column toxicity to *S. capricornutum*.

There have been 10 exceedances of the arsenic WQTL (10 µg/L) from 2006 through 2008, all occurring during irrigation months. Available PUR records indicate no product containing arsenic has been applied in this subwatershed for the past 10 years.

Although the Coalition will continue to collect these data, the constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

Grant Line Canal @ Clifton Court Rd is one of the second three priority site subwatersheds within the SJCDWQC and is in its first year of focused outreach (2010-2012). The Coalition's strategy for the Grant Line Canal @ Clifton Court Rd subwatershed has been to target growers who have applied chlorpyrifos in the past. Focus will be on tail water management and minimizing spray drift. Outreach includes grower notification, management practice education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practices and assess future planned implementations are in the process of being filled out and will be completed by the end of October 2010. The Coalition will then assess these results and plan the final stages of outreach including re-contacting growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.

V. GRANT LINE CANAL NEAR CALPACK RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority D

- *Ceriodaphnia dubia* water column toxicity
- *Hyalella azteca* sediment toxicity

Priority E

- Arsenic
- Dissolved Oxygen
- *E. coli*
- Specific Conductivity
- Total Dissolved Solids
- *Selenastrum capricornutum* water column toxicity

Description of Grant Line Canal near Calpack Rd Site Subwatershed

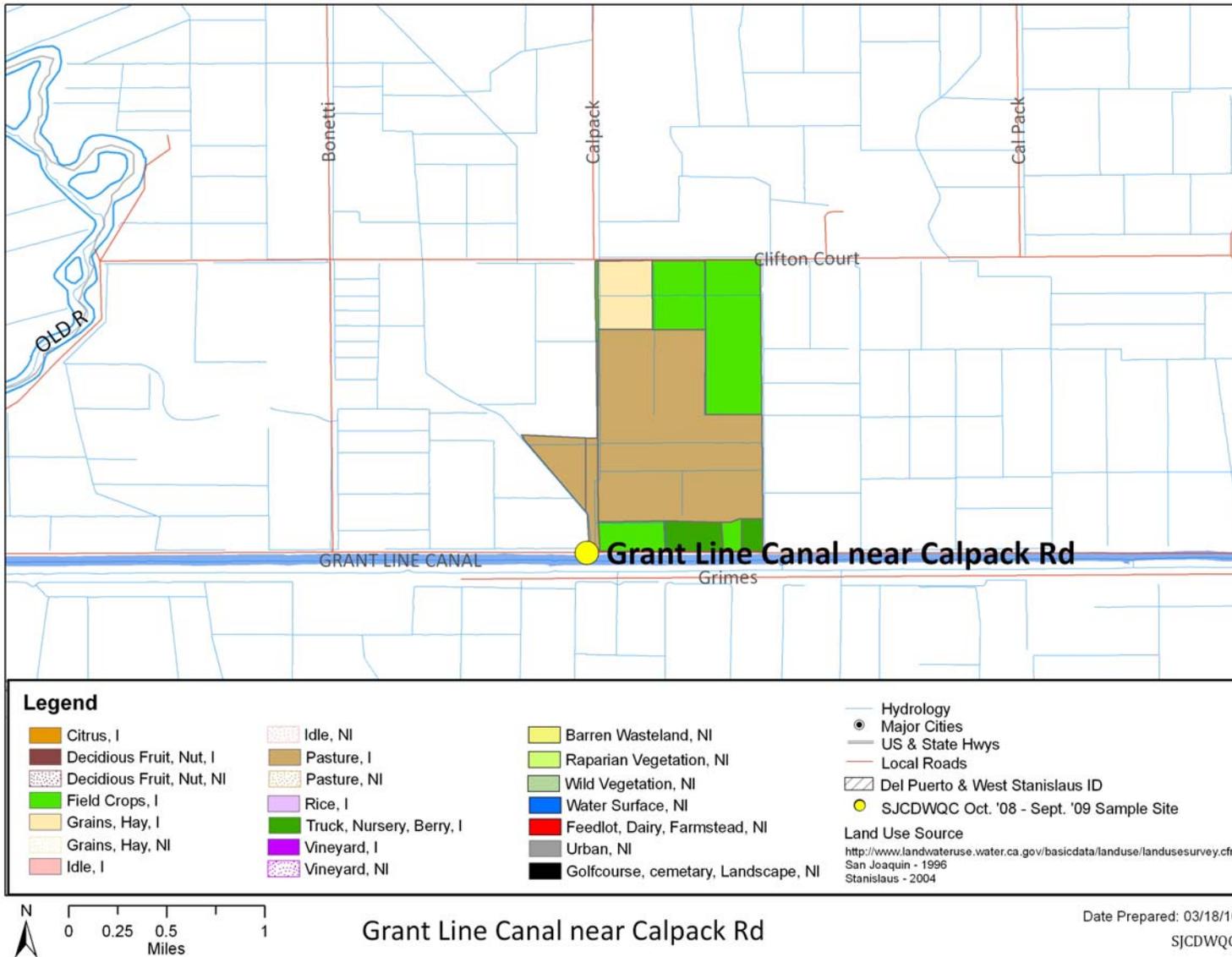
Grant Line Canal near Calpack Rd (1,071 irrigated acres) is located on the south west section of Union Island. Table V-1 includes the station name, station code and target latitude/longitudes for the site sampled within this subwatershed. The site is adjacent to Grant Line Canal (GLC) at a pumping station and drains fields immediately to the north and east of the drain pump. The crops grown are primarily alfalfa, field crops (e.g. asparagus and tomatoes), and grains (Figure V-1).

The GLC is located in the Bay-Delta tidal prism and receives water from east and west inputs. The source of water in the GLC depends on delta tides, natural flows of large water bodies such as the San Joaquin River (SJR), the operation of agriculture barriers, and the operation of the pumping plants at Clifton Court Forebay.

Table V-1. Coordinates of the Grant Line Canal near Calpack Rd site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Grant Line Canal near Calpack Rd	544XGLCCR	37.8205	-121.4999

Figure V-1. Site subwatershed map of land use for sample site at Grant Line Canal near Calpack Rd.



Subwatershed Monitoring History

Monitoring at Grant Line Canal near Calpack Rd began in the storm season of 2005 and continued through 2008 (Table V-2). Starting in October 2008, Grant Line Canal near Calpack Rd was removed from the monitoring schedule and became an Assessment site under the new Monitoring Reporting Program Plan (MRPP). It is scheduled for Assessment monitoring in 2028-2029. The constituents sampled at this location from 2005-2008 are listed in Table V-3.

Management Plan Monitoring occurred at Grant Line Canal near Calpack Rd in 2007 for chlorpyrifos and toxicity to *Ceriodaphnia* (Table V-4). The site subwatershed was monitored twice a month for chlorpyrifos during July and August 2007 and twice for *Ceriodaphnia* toxicity during July 2007.

The GLC is not considered impaired in the proposed 2008 Basin Plan, however the Old River section that runs from the SJR to the Delta Mendota Canal, parallel to the Canal, is 303d listed and is impaired as a result of low DO due to hydromodification. The export waters of the Delta are 303d listed for chlorpyrifos, low DO and salinity. This includes the Delta Mendota Canal and the California Aqueduct, both of which receive water from Grant Line Canal. The source of these impairments is listed as unknown.

Table V-2. Grant Line Canal near Calpack Rd sampling events per season and year.

	2004		2005		2006		2007		2008		2009			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA
Events Not Sampled	NA	0	0	0	0	0	0	0	0	NA	NA	NA	NA	NA
Total	NA	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA

NA - Not applicable. This site was not sampled during this season/year.

Table V-3. Number of analyses performed per analyte in each sampling season and year for the Grant Line Canal near Calpack Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
Field and Physical Parameters										
NA	pH	3	6	3	6	4	10	3	9	
NA	Electrical Conductivity	4	6	3	6	4	10	3	9	
NA	Dissolved Oxygen	4	6	3	6	4	10	3	9	
EPA 160.1	Total Dissolved Solids	2	5	2	5	2	6	1	6	
EPA 180.1	Turbidity	2	5	2	5	2	6	1	6	
SM 9223 B	E. coli	2	5	2	6	2	7	1	6	
EPA 110.2	Color	2	5	2	5	2	6	1	6	
EPA 415.1	Total Organic Carbon	2	5	2	5	2	6	1	6	
EPA 405.1	Biological Oxygen Demand				1	2	2			
Carbamates										
EPA 8321A	Aldicarb				5	2	6	1	6	
EPA 8321A	Carbaryl				5	2	6	1	6	
EPA 8321A	Carbofuran				5	2	6	1	6	
EPA 8321A	Methiocarb				5	2	6	1	6	
EPA 8321A	Methomyl				5	2	6	1	6	
EPA 8321A	Oxamyl				5	2	6	1	6	
Organochlorines										
EPA 8081A	DDD				5	2	6	1	6	
EPA 8081A	DDE				5	2	6	1	6	
EPA 8081A	DDT				5	2	6	1	6	
EPA 8081A	Dicofol				5	2	6	1	6	
EPA 8081A	Dieldrin				5	2	6	1	6	
EPA 8081A	Endrin				5	2	6	1	6	
EPA 8081A	Methoxychlor				5	2	6	1	6	
Organophosphates										

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
EPA 8141A	Azinphos methyl				5	2	6	1	6	
EPA 8141A	Chlorpyrifos	2	5	2	5	2	8	1	6	
EPA 8141A	Diazinon	2	5	2	5	2	6	1	6	
EPA 8141A	Dimethoate				5	2	6	1	6	
EPA 8141A	Disulfoton				5	2	6	1	6	
EPA 8141A	Malathion				5	2	6	1	6	
EPA 8141A	Methamidophos				5	2	6	1	6	
EPA 8141A	Methidathion				5	2	6	1	6	
EPA 8141A	Parathion, Methyl				5	2	6	1	6	
EPA 8141A	Phorate				5	2	6	1	6	
EPA 8141A	Phosmet				5	2	6	1	6	
Pyrethroids										
EPA 8081A	Bifenthrin		1	2	5	2	6	1	6	
EPA 8081A	Cypermethrin	2	5	2	5	2	6	1	6	
EPA 8081A	Cyhalothrin, lambda	2	5	2	5	2	6	1	6	
EPA 8081A	Permethrin	2	5	2	5	2	6	1	6	
EPA 8081A	Cyfluthrin		1	2	5	2	6	1	6	
EPA 8081A	Esfenvalerate/ Fenvalerate	2	5	2	5	2	6	1	6	
Triazines										
EPA 619	Atrazine				5	2	6	1	6	
EPA 619	Cyanazine				5	2	6	1	6	
EPA 8321A	Diuron				5	2	6	1	6	
EPA 574M	Glyphosate				5	2	6	1	6	
EPA 8321A	Linuron				5	2	6	1	6	
EPA 8141A	Molinate				5	2	6	1	6	
EPA 549.2M	Paraquat dichloride				5	2	6	1	6	
EPA 619	Simazine				5	2	6	1	6	

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
EPA 8141A	Thiobencarb				5	2	6	1	6	
Metals (Total)										
EPA 200.8	Arsenic				5	2	6	1	6	
EPA 200.8	Boron				5	2	6	1	6	
EPA 200.8	Cadmium				5	2	6	1	6	
EPA 200.8	Copper				5	2	6	1	6	
EPA 200.8	Lead				5	2	6	1	6	
EPA 200.8	Nickel				5	2	6	1	6	
EPA 200.8	Selenium				5	2	2	1	6	
EPA 200.8	Zinc				5	2	6	1	6	
Nutrients										
EPA 300.0	Nitrate as NO3				5	2	6	1	6	
EPA 354.1	Nitrite as Nitrogen				5	2	6	1	6	
EPA 350.2	Ammonia				5	2	6	1	6	
SM 2340 C	Hardness as CaCO3				5	2	6	1	6	
EPA 365.2	Phosphate as P				5	2	6	1	6	
EPA 365.2	Orthophosphate				5	2	6	1	6	
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	1	6	
Toxicity										
EPA 821-02-012	Ceriodaphnia dubia	3	6	2	6	2	8	1	6	
EPA 821-02-012	Pimephales promelas	2	5	2	5	2	7	1	6	
EPA 821-02-013	Selenastrum capricornutum	3	5	2	5	2	9	2	8	
EPA 600/R-99-064	Hyalella azteca		5	1	1	2	1	1	1	

*Site not sampled during the 2008 fall season.

Table V-4. Grant Line Canal near Calpack Rd site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos	<i>Ceriodaphnia dubia</i> Toxicity
Grant Line Canal near Calpack Rd	30-Jul-07	A	X	X
Grant Line Canal near Calpack Rd	28-Aug-07	A	X	

Exceedance History

During Coalition monitoring, exceedances of WQTLs for field and physical parameters, *E. coli*, metals, pesticides, and water column and sediment toxicity have occurred at this site (Table V-5). Sample results from all four years at Grant Line near Calpack Rd included exceedances of WQTLs for DO (35), SC (42), *E. coli* (19), TDS (25), ammonia (1), arsenic (4), chlorpyrifos (4), DDE (1), disulfoton (1), diuron (1) and linuron (1). There have been a total of 19 instances of toxicity, three to *Ceriodaphnia*, six to *Hyaella*, and ten to *Selenastrum*. In 2008, results from sampling the Grant Line Canal near Calpack Rd accounted for exceedances in: DO (10), SC (12), *E. coli* (4), TDS (7), arsenic (1), and six instances of toxicity to *Selenastrum capricornutum*.

All exceedances are listed in Table V-5 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table V-5 and is determined using the SJCDWQC Management Plan prioritization process flow chart (Figure 3). The top priority constituents for Grant Line Canal near Calpack Rd subwatershed are chlorpyrifos and toxicity to *Ceriodaphnia*.

Table V-5. All exceedances experienced in samples collected from locations within the Grant Line near Calpack Rd site subwatershed between February 2005 and September 2008 (sorted by season and date). If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	Specific Conductivity, 700 µS/cm	<i>E. coli</i> , 235 MPN/100 mL	Dissolved Solids, 450 mg/L	Ammonia, 1.5 mg/L	Arsenic, 10 µg/L	Chlorpyrifos, 0.015 µg/L	DDE (p,p'), 0.00059 µg/L	Disulfoton, 0.05 µg/L	Diuron, 2 µg/L	Linuron, 1.4 µg/L	<i>C. dubia</i> , Survival (%)	<i>H. azteca</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count
Grant Line Canal near Calpack Rd	Storm	2/16/2005		1412	240	930										129000
Grant Line Canal near Calpack Rd	Storm	2/23/2005	6.8	1834												
Grant Line Canal near Calpack Rd	Storm	3/21/2005		1970		1200			0.076					75		
Grant Line Canal near Calpack Rd	Storm	4/4/2005	4.8	2140												
Grant Line Canal near Calpack Rd	Irrigation	5/17/2005	6.3	847		550									43.8	
Grant Line Canal near Calpack Rd	Irrigation	6/21/2005	5.1	835	1600	520										
Grant Line Canal near Calpack Rd	Irrigation	7/19/2005	4.8		500				0.053						68.8	
Grant Line Canal near Calpack Rd	Irrigation	8/16/2005	3.8	1077	1600	670			0.15					5		
Grant Line Canal near Calpack Rd	Irrigation	8/23/2005	4.2	759												
Grant Line Canal near Calpack Rd	Irrigation	9/20/2005	2.9	1390	500	840									88.8	
Grant Line Canal near Calpack Rd	Storm	2/27/2006		1910		1200										
Grant Line Canal near Calpack Rd	Storm	3/15/2006		1660		1100										
Grant Line Canal near Calpack Rd	Storm	4/27/2006	5	2220											20	
Grant Line Canal near Calpack Rd	Irrigation	5/16/2006	1		2400			12	0.12					10		
Grant Line Canal near Calpack Rd	Irrigation	5/25/2006	4.1	806												
Grant Line Canal near Calpack Rd	Irrigation	6/20/2006	2.88	791	2400	530		16								
Grant Line Canal near Calpack Rd	Irrigation	7/18/2006	2.2	757	2000	590				0.0067						
Grant Line Canal near Calpack Rd	Irrigation	8/15/2006	1.3	727	2400		4.1						1.6			
Grant Line Canal near Calpack Rd	Irrigation	9/19/2006	2.8		300											

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	Specific Conductivity, 700 µS/cm	<i>E. coli</i> , 235 MPN/100 mL	Dissolved Solids, 450 mg/L	Ammonia, 1.5 mg/L	Arsenic, 10 µg/L	Chlorpyrifos, 0.015 µg/L	DDE (p,p'), 0.00059 µg/L	Disulfoton, 0.05 µg/L	Diuron, 2 µg/L	Linuron, 1.4 µg/L	<i>C. dubia</i> , Survival (%)	<i>H. azteca</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count
Grant Line Canal near Calpack Rd	Storm	2/11/2007		1583	2000	1000										
Grant Line Canal near Calpack Rd	Storm	2/28/2007		1505		940										
Grant Line Canal near Calpack Rd	Storm	3/7/2007		1624											12.5	
Grant Line Canal near Calpack Rd	Storm	3/29/2007		1200											5	
Grant Line Canal near Calpack Rd	Irrigation	4/11/2007	2.76	972	490	610										378000
Grant Line Canal near Calpack Rd	Irrigation	4/19/2007														685000
Grant Line Canal near Calpack Rd	Irrigation	5/22/2007	6.24	1222		750										
Grant Line Canal near Calpack Rd	Irrigation	6/12/2007	5.48	1209	980	790										
Grant Line Canal near Calpack Rd	Irrigation	7/10/2007	6.2	1289	550	790										755273
Grant Line Canal near Calpack Rd	Irrigation	7/17/2007	3	1123												
Grant Line Canal near Calpack Rd	Irrigation	7/30/2007	1.22	998												
Grant Line Canal near Calpack Rd	Irrigation	8/7/2007	3.42	956	980	630					0.083	2.8				
Grant Line Canal near Calpack Rd	Irrigation	8/9/2007	4.97	1174												
Grant Line Canal near Calpack Rd	Irrigation	8/28/2007	2.3	1654												
Grant Line Canal near Calpack Rd	Irrigation	9/4/2007	1.89	1225		810		12								
Grant Line Canal near Calpack Rd	Storm	1/23/2008	5.49	1736		1200										22561
Grant Line Canal near Calpack Rd	Storm	1/30/2008	5.34	1877												110486
Grant Line Canal near Calpack Rd	Sediment	3/18/2008		1891												
Grant Line Canal near Calpack Rd	Irrigation	4/15/2008	5.84	1205		800										103973
Grant Line Canal near Calpack Rd	Irrigation	4/23/2008	3.59	1112												976715
Grant Line Canal near Calpack Rd	Irrigation	5/13/2008		1733		1100										17852
Grant Line Canal near Calpack Rd	Irrigation	5/21/2008	4.95	1067												1859227

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	Specific Conductivity, 700 µS/cm	<i>E. coli</i> , 235 MPN/100 mL	Dissolved Solids, 450 mg/L	Ammonia, 1.5 mg/L	Arsenic, 10 µg/L	Chlorpyrifos, 0.015 µg/L	DDE (p,p'), 0.00059 µg/L	Disulfoton, 0.05 µg/L	Diuron, 2 µg/L	Linuron, 1.4 µg/L	<i>C. dubia</i> , Survival (%)	<i>H. azteca</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count
Grant Line Canal near Calpack Rd	Irrigation	6/10/2008	3.33	1066	240	560										
Grant Line Canal near Calpack Rd	Irrigation	7/15/2008	3.8	927	>2400	530										
Grant Line Canal near Calpack Rd	Irrigation	8/12/2008	0.45	945	>2400	570										
Grant Line Canal near Calpack Rd	Sediment	8/13/2008	2.79	899												
Grant Line Canal near Calpack Rd	Irrigation	9/16/2008	0.47	1049	2400	680		11								
Constituent Priority			E	E	E	E	NP	E	A/B	NP	NP	NP	NP	D	D	E

NP – Not prioritized; fewer than two exceedances for this constituent at this site within three years, and currently no TMDL for constituent.

2007 and 2008 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table V-6 for chlorpyrifos and *Ceriodaphnia* toxicity for 2007 through 2008. Although there was no upstream monitoring for Grant Line Canal near Calpack Rd during 2008, normal monitoring occurred and the results are used to assess chlorpyrifos exceedances and toxicity to *Ceriodaphnia* and are included in Table V-6.

2007

In 2007, Grant Line Canal near Calpack Rd was monitored monthly for chlorpyrifos and toxicity to *Ceriodaphnia* from April through September plus additional monitoring conducted in July for chlorpyrifos only and in August for both. The chlorpyrifos WQTL was never exceeded in samples collected during normal monitoring (NM) and additional (A) MPM events (Table V-6).

2008

No upstream site was monitored as a part of MPM at Grant Line Canal near Calpack Rd. Normal monitoring occurred at the site during 2008, and there were neither exceedances of chlorpyrifos nor toxicity to *Ceriodaphnia* (Table V-6).

2009

Grant Line Canal near Calpack Rd was not scheduled for 2009 MPM.

The Coalition plans to conduct MPM at Grant Line Canal near Calpack Rd during the irrigation season of 2010 for chlorpyrifos and *Selenastrum* toxicity. Management Plan Monitoring during January, February, and March of 2011 is scheduled for chlorpyrifos, *Selenastrum* toxicity, and *Hyalella* toxicity.

Table V-6. Grant Line Canal near Calpack Rd site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for chlorpyrifos and toxicity to *Ceriodaphnia dubia* where 'A' indicates additional MPM (2007). Exceedance values are in bold.

Month:		April	May	June	July	August	September
2007 NM (near Calpack Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	<i>C. dubia</i> toxicity (% Control)	100	95	95	100	100	100
2007 MPM A (near Calpack Rd)	Date	NA	NA	NA	7/30/07	8/28/07	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	NA	100	NA
2008 NM (near Calpack Rd)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	<i>C. dubia</i> toxicity (% Control)	100	87.5	100	100	100	100

NA - Not applicable; this site was not sampled during this month for particular consistent.

Load Calculations

Loads have been calculated for the chlorpyrifos detections based on the following formula (Table I-7):

Load = Discharge (cfs) X 28.317L X Concentration (milligram/L X 1000 or µg/L).

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table V-7. Grant Line near Calpack Rd. Instantaneous load calculations for chlorpyrifos where discharge was measured (sorted by analyte, site and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Grant Line Canal near Calpack Rd	Chlorpyrifos	21-Mar-05	0	0.076	0
Grant Line Canal near Calpack Rd	Chlorpyrifos	19-Jul-05	0	0.053	0
Grant Line Canal near Calpack Rd	Chlorpyrifos	16-Aug-05	0	0.15	0
Grant Line Canal near Calpack Rd	Chlorpyrifos	20-Jun-06	0	0.011	0

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent listed under the Management Plan for the Grant Line Canal @ near Calpack Rd site subwatershed.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L four times in this subwatershed from 2005 through 2008. Grant Line Canal @ Clifton Court Rd was not sampled in 2009.

The greatest amount of chlorpyrifos use occurred in March 2005 (1,580.3 lbs) whereas the lowest amount of use occurred in April 2006 (61.5 lbs, Table V-8, Figure V-2). Overall, the amount of chlorpyrifos applied within the subwatershed has decreased since 2005, with no applications reported for 2007, 2008, and 2009 (Table V-8, Figure V-2). Not all exceedances occurred during months of the greatest amount of use, however all months with exceedances did have applications (Figure V-2).

The largest amount of chlorpyrifos applied was to alfalfa (8,019.220 lbs) followed by asparagus (1,724.495 lbs) (Table V-9). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table V-9).

Table V-8. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for 2005–2009 in the Grant Line Canal near Calpack Rd site subwatershed. No chlorpyrifos applications took place in 2007 - 2009.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
March, 2005	86	1580.3	3306.4
July, 2005	39	1071.9	2266.3
August, 2005	37	1273.7	2145.6
September, 2005	38	1138.4	2067.6
March, 2006	40	893.4	2294.5
April, 2006	6	61.5	247
May, 2006	13	209.8	345.7
July, 2006	7	216.7	435
August, 2006	34	1577.2	3531.4
September, 2006	22	1155.6	2207
October, 2006	19	949.7	1030
Summaries by Year			
2005 Total	200	5064.2	9785.8
2006 Total	141	5063.9	10090.5
Total	341	10,128	19,876.3

Figure V-2. Pounds of chlorpyrifos applied within the Grant Line Canal near Calpack Rd site subwatershed by month for 2005-2009. No chlorpyrifos PUR data reported for 2007-2009. Asterisk (*) denotes months in which chlorpyrifos exceedances were detected at the site.

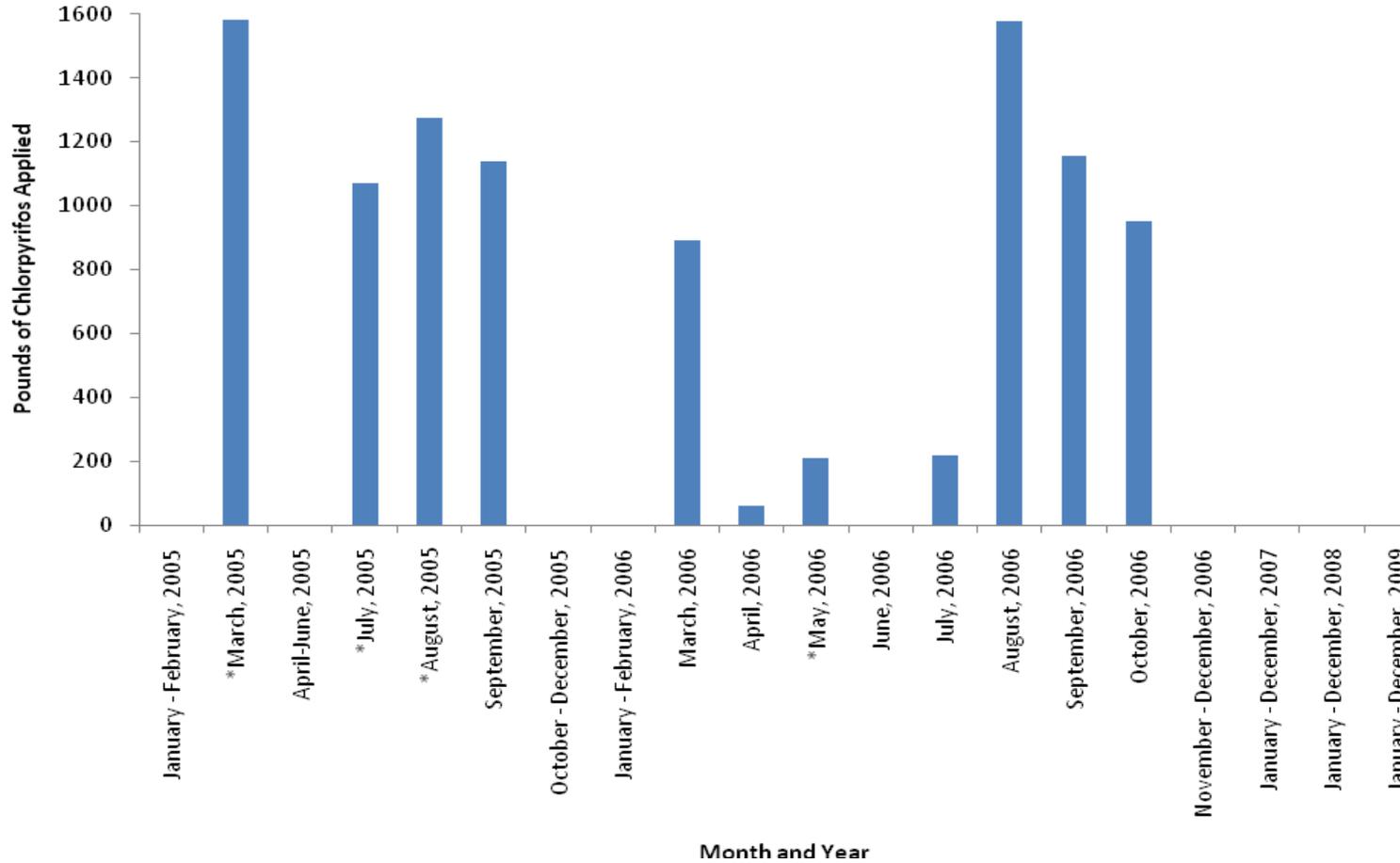


Table V-9. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2005-2009 within the Grant Line Canal near Calpack Rd subwatershed. No chlorpyrifos PUR data reported for 2007-2009.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	3040.063
		LORSBAN 4E INSECTICIDE	89.149
		LORSBAN 4E-HF	4890.007
	ASPARAGUS (SPEARS, FERNS, ETC.)	LORSBAN 4E INSECTICIDE	303.157
		LORSBAN 4E-HF	1421.337
	CORN (FORAGE - FODDER)	LORSBAN 4E-HF	42.563
	GRAPES	LORSBAN 4E-HF	41.871
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	LORSBAN 15G GRANULAR INSECTICIDE	100.500
	SUGARBEET, GENERAL	LORSBAN 4E-HF	199.385
ALFALFA – Total Pounds Chlorpyrifos Applied			8019.220
ASPARAGUS – Total Pounds Chlorpyrifos Applied			1724.495
CORN– Total Pounds Chlorpyrifos Applied			42.563
GRAPES – Total Pounds Chlorpyrifos Applied			41.871
ONION – Total Pounds Chlorpyrifos Applied			100.500
SUGARBEET – Total Pounds Chlorpyrifos Applied			199.385
Total pounds chlorpyrifos applied (2005 - 2006)			10,128.033

The Coalition determined that the most efficient and effective method of outreach is to target specific members who have used chlorpyrifos in the past and to contact both the growers and associated grower permittees. No use of chlorpyrifos has been reported and no exceedances have occurred in the subwatershed since 2006 (see the SJCDWQC General Survey Summary Report submitted on December 30, 2008 for details on the management practices within this subwatershed). Based on results from general management practice surveys, approximately 927 acres of the member acreage utilize recirculation and/or tail water return systems. The Coalition anticipates that targeted outreach will increase the use of irrigation water management practices within Grant Line Canal near Calpack Rd.

As part of the first year of the Management Plan process, individual surveys must be filled out by targeted growers. Because of the relatively small number of members in the Grant Line Canal near Calpack Rd site subwatershed, and its similarity in issues and crop type to the Grant Line Canal @ Clifton Court Rd site subwatershed (see previous section), these subwatersheds are being targeted jointly. The Coalition sent out mailings to the four targeted growers from both subwatersheds in early January to invite members and their associated permittees to a meeting on January 28, 2010 (two members from either subwatershed). The mailing included a meeting agenda and an individual management practice survey to be completed during the meeting. At the meeting, Coalition representatives presented an overview of the Coalition’s purpose, current water quality issues, and status of the ILRP. Various management practices

that are effective in reducing runoff of water and sediment that contribute to high priority exceedances, specifically chlorpyrifos, were discussed. The attendees at the meeting grow mostly alfalfa or other row crops. Therefore, the Coalition discussed alfalfa weevil management, alfalfa worm management and alfalfa aphid management as well as switching to products other than those containing chlorpyrifos as another option for reducing/eliminating chlorpyrifos that is pumped directly into GLC. Focus was also on drift issues and concerns including minimizing spray drift by spraying in favorable conditions, using appropriate nozzle sizes and spray pressures, and maintaining low speeds when applying by ground (6 mph). Although the meeting focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including arsenic exceedances, *C. dubia*, *S. capricornutum*, and *H. azteca* toxicity, and exceedances of *E. coli*, DO, SC, and TDS. Surveys were completed by three members that document their current practices and indicate which recommended practices growers anticipated implementing in the upcoming year (one survey for Grant Line Canal @ Clifton Court Rd and two surveys for Grant Line Canal near Calpack Rd). The Coalition is in the process of compiling and assessing the surveys.

The Coalition contacted four growers within the two Grant Line Canal subwatersheds and three members have completed and returned surveys. The Coalition plans to follow up with the one outstanding member with phone calls and/or additional mailings.

Because these meetings occurred prior to the irrigation season, the Coalition is hopeful that members will begin to implement recommended management practices during the spring of 2010. However the Coalition understands that limited grower resources and other factors may delay implementation. Additionally, implementation of long term structural management practices will most likely take longer than two years to put into operation and will require additional tracking to document their implementation. Growers will be contacted in November 2010 to determine what practices were implemented during the 2010 irrigation year. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year. Not all growers will need to be contacted during the second fall. To obtain the information on practices implemented since the interview/meeting, the Coalition anticipates either conducting phone interviews or sending out a brief letter that includes a survey for the grower to complete.

To evaluate the implementation of new management practices, the Coalition will monitor at Grant Line Canal near Calpack Rd during 2010 and 2011. Depending on when additional management practices are implemented, the Coalition may monitor through 2012 to evaluate water quality improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or the potential for spray drift will improve downstream water quality by the end of the second year as a high priority site subwatershed.

Priority D Constituents

Priority D constituents under the Grant Line Canal near Calpack Rd include arsenic, water column toxicity to *Ceriodaphnia* and sediment toxicity to *Hyalella*.

***Ceriodaphnia* toxicity**

Ceriodaphnia is listed as a Priority D constituent for the Grant Line Canal near Calpack Rd subwatershed. Toxicity to *Ceriodaphnia* occurred three times during normal monitoring, once each in March and August 2005 and May 2006. All three toxicities were associated with chlorpyrifos exceedances. The Coalition conducted additional MPM in 2007 along with normal monitoring in 2007 and 2008, but no toxicity was experienced.

The Coalition's strategy for eliminating *Ceriodaphnia* toxicity has been to focus on chlorpyrifos. If chlorpyrifos can be prevented from entering the waterways during the irrigation season, the Coalition believes that *Ceriodaphnia* toxicity can also be reduced or eliminated. Of note, all but one chlorpyrifos exceedance had an associated *Ceriodaphnia* toxicity, and the last chlorpyrifos exceedance coincided with the last *Ceriodaphnia* toxicity, which further confirms the Coalition's strategy should be effective.

***Hyalella* toxicity**

Hyalella toxicity occurred in May, July and September 2005, April 2006 and March 2007. The Coalition has initiated management plan sampling for sediment toxicity. As of 2009, the Coalition now tests for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. Toxicity was not experienced during 2008 sampling, but the Coalition will conduct MPM for this site in 2010 or 2011.

Priority E Constituents

Priority E constituents under the Grant Line Canal near Calpack Rd Management Plan include DO, SC, TDS, *E. coli*, and water column toxicity to *S. capricornutum*.

There have been four exceedances of the arsenic WQTL (10 µg/L) from 2006 through 2008 all occurring during irrigation months. Available PUR data indicate no product containing arsenic has been applied in this subwatershed in the past 10 years.

Although the Coalition will continue to collect these data, the constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

Grant Line Canal near Calpack Rd is one of the second three priority site subwatersheds within the SJCDWQC and is in its first year of focused outreach (2010-2012). The Coalition's strategy

for the Grant Line Canal near Calpack Rd subwatershed has been to target growers who have applied chlorpyrifos in the past. Focus will be on tail water management and minimizing spray drift. Outreach includes grower notification, management practice education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practices and assess planned implementation will be completed by the end of October 2010. The Coalition will then assess these results and plan the final stages of outreach including re-contacting growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.

VI. LITTLEJOHNS CREEK @ JACK TONE RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos
- Diazinon

Priority C

- Copper

Priority D

- *Selenastrum capricornutum* water column toxicity

Priority E

- Dissolved Oxygen
- *E. coli*

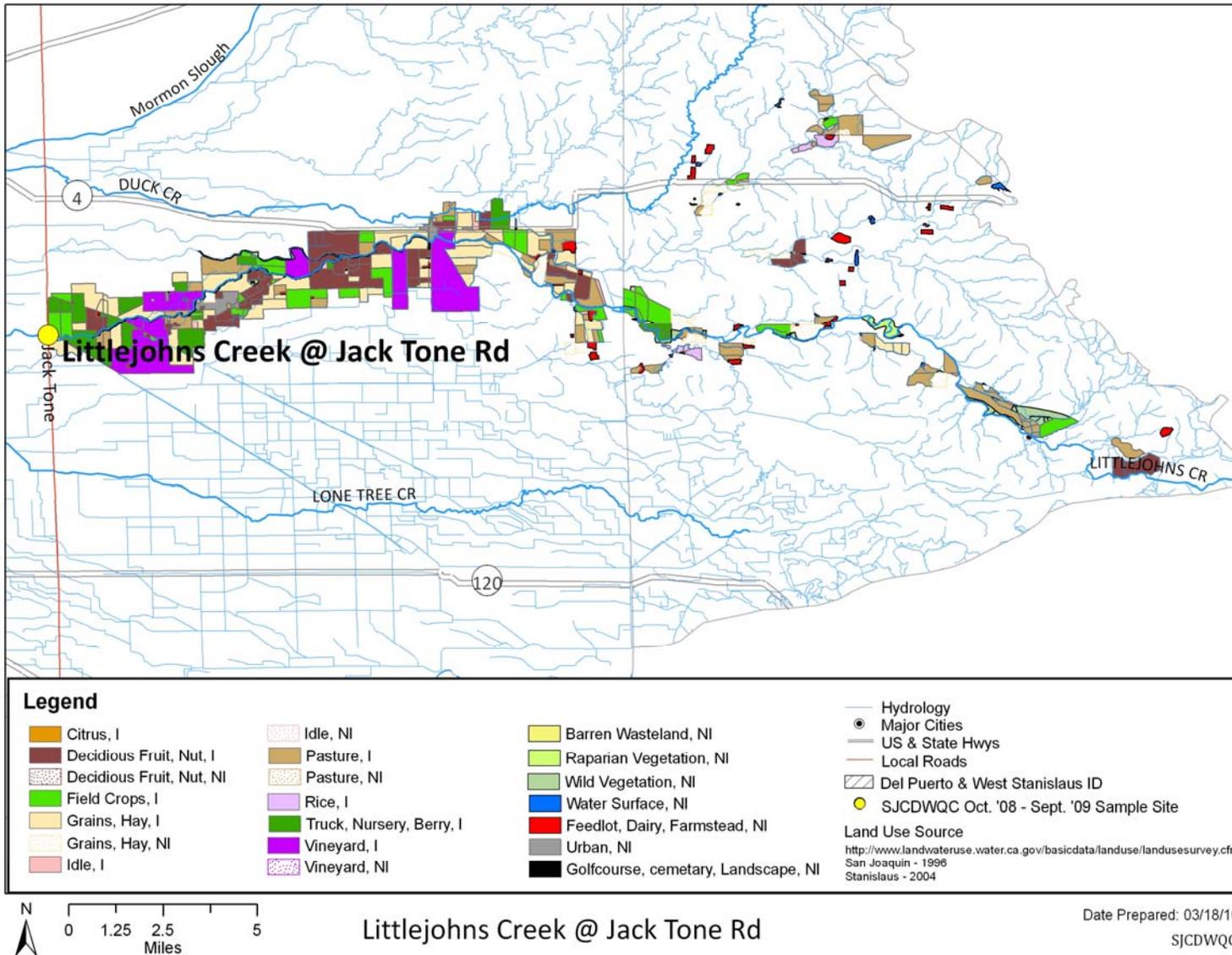
Description of Littlejohns Creek @ Jack Tone Rd Site Subwatershed

Littlejohns Creek @ Jack Tone Road (15,600 irrigated acres) originates at the western edge of Woodward Reservoir, flowing east through the Farmington Flood Control basin and eventually confluences with Lone Tree Creek to form French Camp Slough. The Creek originally flowed intermittently, but summer releases from water storage (from at least five dams) and irrigation return flows have resulted in year round flow. Within the Woodward Reservoir subwatershed there are at least 38 mine shafts, both underground and open pit, related to at least five underground mines that were active through 1955. The crops grown in the site subwatershed represent all of the major types of agriculture present in the Coalition region including field crops, orchards, grains, and vineyards as well as irrigated pasture (Figure VI-1). This site subwatershed includes two upstream locations (Littlejohns Creek @ 26 Mile Rd and Littlejohns Creek @ Escalon Bellota) which were sampled in 2008. Table VI-1 includes the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

Table VI-1. Coordinates of the Littlejohns Creek @ Jack Tone Rd site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Littlejohns Creek @ Escalon Bellota	531XLCAER	37.9255	-120.9991
Littlejohns Creek @ 26 Mile Rd	531LCATMR	37.8932	-120.8776
Littlejohns Creek @ Jack Tone Rd [†]	531XLCAJR	37.8896	-121.1461

Figure VI-1. Site subwatershed map of land use for sample site at Littlejohns Creek @ Jack Tone Rd.



Subwatershed Monitoring History

Ambient water monitoring conducted at Littlejohns Creek @ Jack Tone Rd was initiated during the irrigation season of 2004 and continued through the 2008 irrigation season (Table VI-2). Starting in October 2008, Littlejohns Creek @ Jack Tone Rd was removed from the monitoring schedule and became an Assessment site under the new Monitoring Reporting Program Plan (MRPP). It is scheduled for Assessment monitoring in 2013-2014. The constituents sampled at this location from 2005-2009 are listed in Table VI-3.

Management Plan Monitoring occurred within the Littlejohns Creek site subwatershed in 2007 and 2008 for chlorpyrifos and toxicity to *Selenastrum* (Tables VI-4 and VI-5). Littlejohns Creek was monitored twice in July for chlorpyrifos and twice in August for *Selenastrum* toxicity in 2007. In 2008, upstream monitoring occurred for both chlorpyrifos and *Selenastrum* toxicity in July and August at Littlejohns Creek @ Escalon Bellota Rd. Upstream monitoring for total metals occurred at Littlejohns Creek @ Escalon Bellota Rd in May and June and at Littlejohns Creek @ 26 Mile Rd in May - September 2008. Littlejohns Creek is scheduled as a high priority site starting in 2010. Management Plan Monitoring did not occur during 2009.

Littlejohns Creek is considered an impaired water body in the proposed 2008 Central Valley Basin Plan and it is listed on the 303d list for *E. coli* and unknown toxicity. The source for these impairments is listed as unknown.

Table VI-2. Littlejohns Creek @ Jack Tone Rd sampling events per season and year.

	2004		2005		2006		2007		2008		2009			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	2	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA
Events Not Sampled	0	0	0	0	0	0	0	0	0	NA	NA	NA	NA	NA
Total	2	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA

NA - Not applicable. This site was not sampled during this season/year.

Table VI-3. Number of analyses performed per analyte in each sampling season and year for the Littlejohns Creek @ Jack Tone Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2004	2005		2006		2007		2008		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
Field and Physical Parameters											
NA	pH	2	4	5	3	5	3	10	2	8	
NA	Electrical Conductivity	2	4	5	3	5	3	10	2	8	
NA	Dissolved Oxygen	2	4	5	2	5	3	10	2	8	
EPA 160.1	Total Dissolved Solids	2	2	5	2	5	2	9	1	6	
EPA 180.1	Turbidity	2	2	5	2	5	2	8	1	6	
SM 9223 B	E. coli	2	2	5	2	6	2	7	1	6	
EPA 110.2	Color	2	2	5	2	5	2	8	1	6	
EPA 415.1	Total Organic Carbon	2	2	5	2	7	2	6	1	6	
EPA 405.1	Biological Oxygen Demand					1	2	2			
Carbamates											
EPA 8321A	Aldicarb					5	2	6	1	6	
EPA 8321A	Carbaryl					5	2	6	1	6	
EPA 8321A	Carbofuran					5	2	6	1	6	
EPA 8321A	Methiocarb					5	2	6	1	6	
EPA 8321A	Methomyl					5	2	6	1	6	
EPA 8321A	Oxamyl					5	2	6	1	6	
Organochlorines											
EPA 8081A	DDD					5	2	6	1	6	
EPA 8081A	DDE					5	2	6	1	6	
EPA 8081A	DDT					5	2	6	1	6	
EPA 8081A	Dicofol					5	2	6	1	6	
EPA 8081A	Dieldrin					5	2	6	1	6	
EPA 8081A	Endrin					5	2	6	1	6	
EPA 8081A	Methoxychlor					5	2	6	1	6	
Organophosphates											

Method	Analyte	2004	2005		2006		2007		2008		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
EPA 8141A	Azinphos methyl					5	2	6	1	6	
EPA 8141A	Chlorpyrifos	2	2	5	2	5	2	7	1	6	
EPA 8141A	Diazinon	2	2	5	2	5	2	6	1	6	
EPA 8141A	Dimethoate					5	2	6	1	6	
EPA 8141A	Disulfoton					5	2	6	1	6	
EPA 8141A	Malathion					5	2	6	1	6	
EPA 8141A	Methamidophos					5	2	6	1	6	
EPA 8141A	Methidathion					5	2	6	1	6	
EPA 8141A	Parathion, Methyl					5	2	6	1	6	
EPA 8141A	Phorate					5	2	6	1	6	
EPA 8141A	Phosmet					5	2	6	1	6	
Pyrethroids											
EPA 8081A	Bifenthrin			1	2	5	2	6	1	6	
EPA 8081A	Cypermethrin	2	2	5	2	5	2	6	1	6	
EPA 8081A	Cyhalothrin, lambda	2	2	5	2	5	2	6	1	6	
EPA 8081A	Permethrin	2	2	5	2	5	2	6	1	6	
EPA 8081A	Cyfluthrin			1	2	5	2	6	1	6	
EPA 8081A	Esfenvalerate/ Fenvalerate	2	2	5	2	5	2	6	1	6	
Triazines											
EPA 619	Atrazine					5	2	6	1	6	
EPA 619	Cyanazine					5	2	6	1	6	
EPA 8321A	Diuron					5	2	6	1	6	
EPA 574M	Glyphosate					5	2	6	1	6	
EPA 8321A	Linuron					5	2	6	1	6	
EPA 8141A	Molinate					5	2	6	1	6	
EPA 549.2M	Paraquat dichloride					5	2	6	1	6	
EPA 619	Simazine					5	2	6	1	6	

Method	Analyte	2004	2005		2006		2007		2008		
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
EPA 8141A	Thiobencarb					5	2	6	1	6	
Metals (Total)											
EPA 200.8	Arsenic					6	2	6	1	6	
EPA 200.8	Boron					6	2	6	1	6	
EPA 200.8	Cadmium					6	2	6	1	6	
EPA 200.8	Copper					6	2	6	1	6	
EPA 200.8	Lead					6	2	6	1	6	
EPA 200.8	Nickel					6	2	6	1	6	
EPA 200.8	Selenium					6	2	2	1	6	
EPA 200.8	Zinc					6	2	6	1	6	
Nutrients											
EPA 300.0	Nitrate as NO3					6	2	6	1	6	
EPA 354.1	Nitrite as Nitrogen					6	2	6	1	6	
EPA 350.2	Ammonia as N					6	2	6	1	6	
SM 2340 C	Hardness as CaCO3					7	2	6	1	6	
EPA 365.2	Phosphate as P					6	2	6	1	6	
EPA 365.2	Orthophosphate					6	2	6	1	6	
EPA 351.3	Nitrogen, Total Kjeldahl					6	2	6	1	6	
Toxicity											
EPA 821-02-012	Ceriodaphnia dubia	2	2	5	2	6	2	7	1	6	
EPA 821-02-012	Pimephales promelas	2	3	5	2	5	2	7	1	6	
EPA 821-02-013	Selenastrum capricornutum	3	3	5	2	5	2	9	1	7	
EPA 600/R-99-064	Hyalella azteca	2		5	1	1	2	2	1	1	

*Site not sampled during the 2008 fall season.

Table VI-4. Littlejohns Creek @ Jack Tone Rd site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos	<i>Selenastrum capricornutum</i> Toxicity
Littlejohns Creek @ Jack Tone Rd	30-Jul-07	A	X	
Littlejohns Creek @ Jack Tone Rd	28-Aug-07	A		X

Table VI-5. Littlejohns Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos	Total Metals	<i>Selenastrum capricornutum</i> Toxicity
Littlejohns Creek @ 26 Mile Rd	13-May-08	U		X	
Littlejohns Creek @ Escalon Bellota Rd	13-May-08	U		X	
Littlejohns Creek @ 26 Mile Rd	10-Jun-08	U		X	
Littlejohns Creek @ Escalon Bellota Rd	10-Jun-08	U		X	
Littlejohns Creek @ 26 Mile Rd	15-Jul-08	U		X	
Littlejohns Creek @ Escalon Bellota Rd	15-Jul-08	U	X		X
Littlejohns Creek @ 26 Mile Rd	12-Aug-08	U		X	
Littlejohns Creek @ Escalon Bellota Rd	12-Aug-08	U	X		X
Littlejohns Creek @ 26 Mile Rd	16-Sep-08	U		X	

Exceedance History

Exceedances of WQTLs for field and physical parameters, *E. coli*, metals, pesticides, and water column and sediment toxicity have occurred at this site (Table VI-6). For all five years of monitoring between 2004 and 2008 there have been exceedances of WQTLs of; DO (17), pH (2), *E. coli* (6), copper (5), carbofuran (1), chlorpyrifos (7), and diazinon (1). There have been six instances of water column toxicity; one to *Pimephales promelas* and five to *Selenastrum capricornutum*, and there have been two instances of sediment toxicity to *Hyaella azteca*. Water quality exceedances from sampling the Littlejohns Creek subwatershed, including upstream monitoring, during the storm and irrigation seasons of 2008 included; DO (7), pH (1), copper (2), carbofuran (1), chlorpyrifos (3), and two instances of toxicity to *Selenastrum capricornutum*.

All exceedances are listed in Table VI-6 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table VI-6 and is determined using the SJCDWQC Management Plan prioritization process flow chart (Figure 3). The top priority constituents for the Littlejohns Creek subwatershed are chlorpyrifos, diazinon, and copper.

Table VI-6. All exceedances experienced in samples collected from locations within the Littlejohns Creek @ Jack Tone Rd site subwatershed between August 2004 and September 2008 (sorted by season and date). If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	<i>E. coli</i> , 235 MPN/100 mL	Copper Total, µg/L	Carbofuran, 0 µg/L	Chlorpyrifos, 0.015 µg/L	Diazinon, 0.1 µg/L	<i>P. promelas</i> , Survival (%)	<i>S. capricornutum</i> , Total Cell Count	<i>H. azteca</i> , Survival (%)
Littlejohns Creek @ Jack Tone Rd	Irrigation	8/24/2004									910500	
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/23/2004	6.7									
Littlejohns Creek @ Jack Tone Rd	Storm	2/16/2005			1600					70		
Littlejohns Creek @ Jack Tone Rd	Storm	3/1/2005		6.37								
Littlejohns Creek @ Jack Tone Rd	Storm	3/21/2005			900						1280000	
Littlejohns Creek @ Jack Tone Rd	Irrigation	5/17/2005			900							
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/19/2005	6.6					0.017				
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/20/2005	5.4		900							
Littlejohns Creek @ Jack Tone Rd	Storm	3/15/2006			1600							
Littlejohns Creek @ Jack Tone Rd	Irrigation	5/16/2006				4.4 (3.9)						
Littlejohns Creek @ Jack Tone Rd	Irrigation	6/20/2006	6.7									

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	E. coli, 235 MPN/100 mL	Copper Total, µg/L	Carbofuran, 0 µg/L	Chlorpyrifos, 0.015 µg/L	Diazinon, 0.1 µg/L	P. promelas, Survival (%)	S. capricornutum, Total Cell Count	H. azteca, Survival (%)
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/18/2006	3.1					0.027				
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/19/2006	5.4									
Littlejohns Creek @ Jack Tone Rd	Storm	2/11/2007						0.029	0.11			
Littlejohns Creek @ Jack Tone Rd	Storm	2/28/2007			2400	11 (9)						
Littlejohns Creek @ Jack Tone Rd	Storm	3/6/2007										78.75
Littlejohns Creek @ Jack Tone Rd	Storm	3/29/2007										83.75
Littlejohns Creek @ Jack Tone Rd	Irrigation	6/12/2007				3.6 (3.3)						
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/10/2007	6.85								628270	
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/17/2007	6.6									
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/30/2007						0.018				
Littlejohns Creek @ Jack Tone Rd	Irrigation	8/28/2007	5.85									
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/4/2007	5.72									
Littlejohns Creek @ Jack Tone Rd	Irrigation	4/15/2008						0.034			61639	
Littlejohns Creek @ Jack Tone Rd	Irrigation	4/23/2008									836686	
Littlejohns Creek @ Jack Tone Rd	Irrigation	5/13/2008	6.7			4.2 (4.1)	0.41					
<i>Littlejohns Creek @ 26 Mile Rd</i>	<i>Irrigation</i>	<i>5/13/2008</i>	<i>4.54</i>	<i>6.32</i>								
Littlejohns Creek @ Jack Tone Rd	Irrigation	6/10/2008						0.077				
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/15/2008						0.025				
<i>Littlejohns Creek @ 26 Mile Rd</i>	<i>Irrigation</i>	<i>7/15/2008</i>	<i>5.50</i>									
Littlejohns Creek @ Jack Tone Rd	Sediment	8/13/2008	6.19									
<i>Littlejohns Creek @ 26 Mile Rd</i>	<i>Irrigation</i>	<i>8/12/2008</i>	<i>6.45</i>									
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/16/2008	6.34			4.2 (3.5)						
<i>Littlejohns Creek @ 26 Mile Rd</i>	<i>Irrigation</i>	<i>9/16/2008</i>	<i>3.65</i>									
Constituent Priority			E	NP	E	C	NP	A/B	A/B	NP	D	NP¹

NP – Not prioritized; fewer than two exceedances for this constituent at this site within three years, and currently no TMDL for constituent.
NP¹ – Not prioritized; both toxic samples were from the same sampling event (sample and resample to test for persistence).

2007 and 2008 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table VI-7 for chlorpyrifos, toxicity to *Selenastrum* and total metals for all years from 2007 through 2008.

2007

In 2007, Littlejohns Creek @ Jack Tone Rd was monitored monthly for chlorpyrifos and toxicity to *Selenastrum* from April through September plus additional monitoring conducted in July for chlorpyrifos, and August for toxicity to *Selenastrum*. No exceedances of the chlorpyrifos WQTL occurred (Table VI-7). No other detections or toxicities occurred (Table VI-7).

2008

In accordance with the 2008 upstream MPM schedule, Littlejohns Creek @ 26 Mile Rd and Littlejohns Creek @ Escalon Bellota Rd were monitored for chlorpyrifos and toxicity to *Selenastrum* in July and August 2008. Upstream MPM also occurred in 2008 for metals at Littlejohns Creek @ 26 Mile Rd during the months of May-September (Table VI-5), and at Littlejohns Creek @ Escalon Bellota during the months of May-August. These locations were selected to provide information on the contribution from either the upper or lower site subwatershed to the load of metals measured at the Littlejohns Creek site. Although total metals were monitored at both the upstream sites, (previous section, Table VI-5); only copper is reported is reported in Table VI-7. There were no other exceedances of metal's WQTLs experienced at this location and all results were reported in the 2009 SAMR. The chlorpyrifos WQTL was exceeded in samples collected during April, June, and July at the normal monitoring site, but never at the upstream monitoring site (Table VI-7). *Selenastrum* toxicity occurred in April at the normal monitoring site, but also never at the upstream monitoring site (Table VI-7). Copper was detected at Littlejohns Creek @ Jack Tone Rd during every sampling event in the 2008 irrigation season with two exceedances (May, and September). Copper was detected at both upstream sites during all MPM except in April at Littlejohns Creek @ 26 Mile Rd. The copper WQTL was exceeded only once in July at Littlejohns Creek @ 26 Mile Rd.

2009

Littlejohns Creek was not scheduled for 2009 MPM and was neither a Core nor Assessment Monitoring Site in 2009.

The Coalition plans to conduct MPM at Littlejohns Creek @ Jack Tone Rd during the irrigation season of 2010 for copper, chlorpyrifos, and *Selenastrum* toxicity. Management Plan Monitoring for January and February 2011 is scheduled for copper, chlorpyrifos, and diazinon and *Selenastrum* toxicity.

Table VI-7. Littlejohns Creek @ Jack Tone Rd site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results, where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM (2008) for chlorpyrifos, copper (2008 only) and toxicity to *Selenastrum capricornutum*. Exceedance values are in bold.

Month		April	May	June	July	August	September
	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
2007 NM (@ Jack Tone Rd)	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	0.013	<0.003	<0.003
	<i>S. capricornutum</i> toxicity (% Control)	133	164	251	71	192	181
	Date	4/10/07	5/22/07	6/12/07	7/30/07	8/28/07	NA
2007 MPM A (@ Jack Tone Rd)	Chlorpyrifos (µg/L)	NA	NA	NA	0.018	NA	NA
	<i>S. capricornutum</i> toxicity (% Control)	NA	NA	NA	NA	363	NA
	Date	4/15/08	5/13/08	6/10/08	7/13/08	8/12/08	9/16/08
2008 NM (@ Jack Tone Rd)	Copper (µg/L)	3.9	4.2 (4.1)	3.1	3.4	2.0	4.2 (3.5)
	Chlorpyrifos (µg/L)	0.034	<0.003	0.077	0.025	<0.003	<0.003
	<i>S. capricornutum</i> toxicity (% Control)	6	93	131	184	167	155
		Date	NA	5/13/08	6/10/08	7/15/08	8/12/08
2008 MPM US (@ 26 Mile Rd)	Copper (µg/L)	NA	1.6	0.9	3.1	0.8	1.0
		Date	NA	5/13/08	6/10/08	7/15/08	8/12/08
2008 MPM US (@ Escalon Bellota Rd)	Copper (µg/L)	1.9	1.8	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA
	<i>S. capricornutum</i> toxicity (% Control)	NA	NA	NA	139	117	NA
		Date	NA	5/13/08	6/10/08	7/15/08	8/12/08

NA – No MPM occurred on this date for this constituent.

Load Calculations

Loads have been calculated for the chlorpyrifos detections based on the following formula (Table VI-8):

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L} \times \text{Concentration (milligram/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table VI-8. Littlejohns Creek site subwatershed. Instantaneous load calculations for chlorpyrifos, copper and diazinon where discharge was measured (sorted by analyte, site and date). Upstream sites are in italics.

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	11-Feb-07	0	0.029	0
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	23-Jan-08	2.45	0.0039	0.27
<i>Littlejohns Creek @ 26 Mile Rd</i>	<i>Copper</i>	<i>16-Sep-08</i>	<i>0</i>	<i>1</i>	<i>0</i>
Littlejohns Creek @ Jack Tone Rd	Copper	16-May-06	23.5	4.4	2927.98

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Littlejohns Creek @ Jack Tone Rd*	Copper	15-Aug-06	12.79	2.1	760.57
Littlejohns Creek @ Jack Tone Rd	Copper	15-Aug-06	12.79	2.5	905.44
Littlejohns Creek @ Jack Tone Rd*	Copper	15-Aug-06	12.79	2.2	796.78
Littlejohns Creek @ Jack Tone Rd	Copper	11-Feb-07	0	6.8	0
Littlejohns Creek @ Jack Tone Rd	Copper	4-Sep-07	0	2.7	0
Littlejohns Creek @ Jack Tone Rd	Copper	23-Jan-08	2.45	3.8	263.63
Littlejohns Creek @ Jack Tone Rd	Diazinon	27-Feb-06	10.45	0.035	10.36
Littlejohns Creek @ Jack Tone Rd	Diazinon	11-Feb-07	0	0.11	0
Littlejohns Creek @ Jack Tone Rd	Diazinon	23-Jan-08	2.45	0.017	1.18

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos and diazinon are listed as priority A/B constituent under the Management Plan for the Littlejohns Creek site subwatershed.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L seven times in this subwatershed from 2004 through 2008. Littlejohns Creek @ Jack Tone Rd was not sampled during 2009 monitoring.

The greatest chlorpyrifos use occurred in 2006 (7,315.4 lbs) with the lowest use occurring in 2008 (1,796.1 lbs) (Table VI-9, Figure VI-2). In 2005-2007, the greatest amount of chlorpyrifos use occurred in May whereas in 2004 the greatest use occurred in July, in 2008 in March, and in 2009 the greatest use occurred in November (Table VI-9, Figure VI-2). Not all exceedances occurred during months of the greatest amount of use (Figure VI-2).

The highest application rates are associated with walnuts, alfalfa, and corn (Table VI-10). The largest amount of chlorpyrifos was applied to walnuts (15,284.456 lbs), followed by alfalfa (3,237.250 lbs) (Table VI-10). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table VI-10).

Table VI-9. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for January 2004 through December 2009 in the Littlejohns Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
March, 2004	17	705.7	846.7
April, 2004	4	262.5	220
May, 2004	19	1373.1	745.5

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
June, 2004	3	165.1	133
July, 2004	16	1730.6	888
August, 2004	13	1034.2	578.2
March, 2005	7	839.2	260
April, 2005	2	986	98.2
May, 2005	20	2511.2	752.3
June, 2005	9	716.4	314.5
July, 2005	22	1669.1	1253.1
August, 2005	9	285.5	462.2
September, 2005	4	123.4	142
March, 2006	2	68.6	65
April, 2006	2	38.5	50
May, 2006	28	3786.5	1288.3
June, 2006	13	1242.2	381.5
July, 2006	18	1374.6	971.5
August, 2006	16	731.1	926.5
September, 2006	1	73.9	80
March, 2007	29	1465.6	1712
April, 2007	12	919.7	621
May, 2007	30	1905.7	1190
June, 2007	5	393.6	196
July, 2007	11	422.7	692
August, 2007	6	305.6	304
March, 2008	13	612.9	503.8
April, 2008	3	247.5	215
May, 2008	4	465.8	288
June, 2008	7	199.7	253
July, 2008	6	270.2	300
March, 2009	7	330.2	174
May, 2009	1	247.7	122.5
June, 2009	4	500.6	260.2
July, 2009	7	347.2	175.5
August, 2009	5	437.1	219
November, 2009	8	1940	1033
Summaries by Year			
2004 Total	72	5271.2	3411.4
2005 Total	73	7130.9	3282.3
2006 Total	80	7315.4	3762.8
2007 Total	93	5413	4715

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
2008 Total	33	1796.1	1559.8
2009 Total	32	3802.8	1984.2
Total	383	30,729.4	18,715.5

Figure VI-2. Pounds of chlorpyrifos applied within the Littlejohns Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2009. Asterisk (*) denotes months with exceedances.

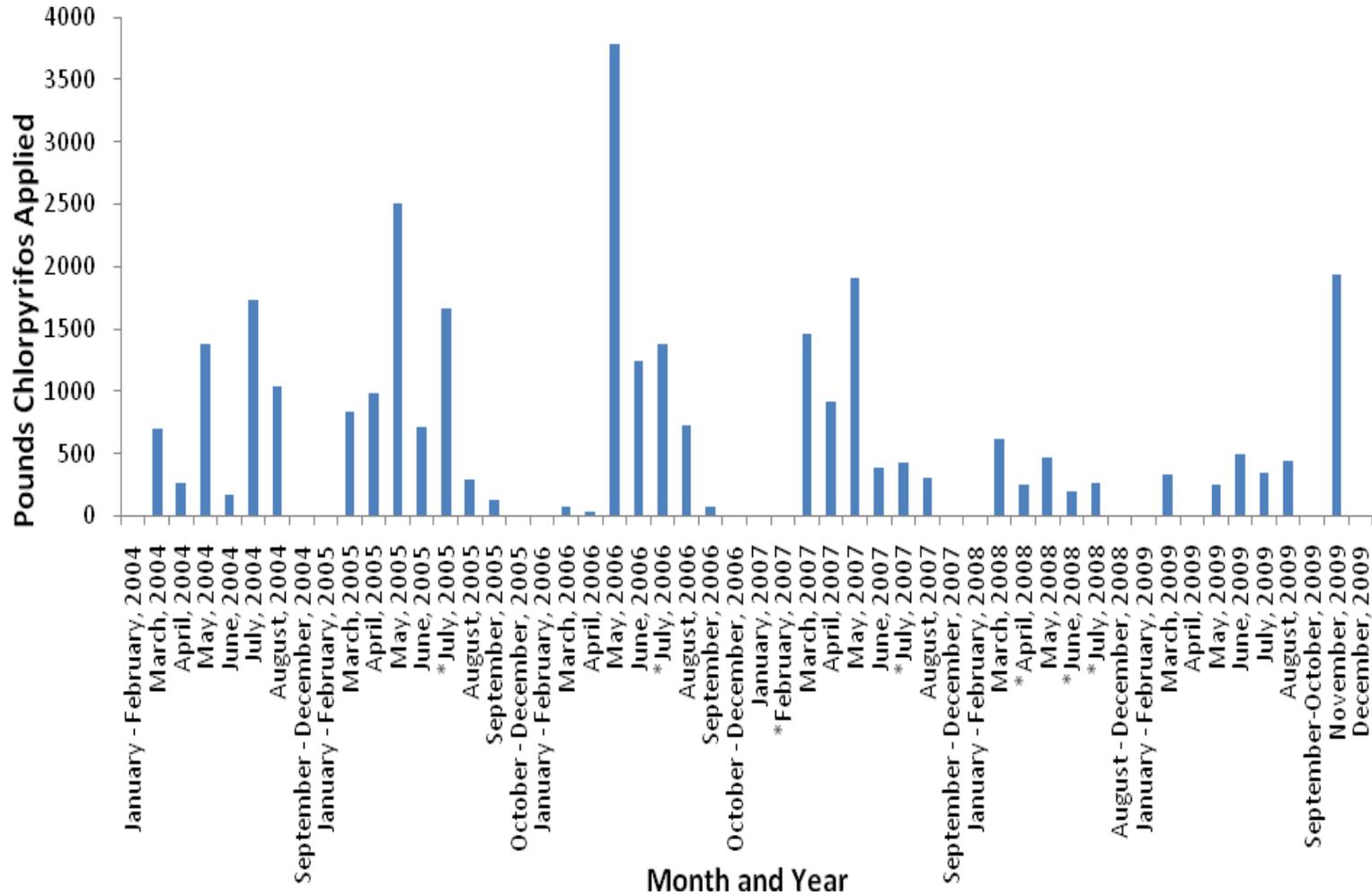


Table VI-10. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2004-2009 within the Littlejohns Creek @ Jack Tone Rd subwatershed. "Unknown Commodity" is listed as the commodity for crops that were not identified in the PUR data.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	UNKNOWN COMMODITY	CHLORPYRIFOS 4E AG	628.004
		LORSBAN 15G GRANULAR INSECTICIDE	165.600
		LORSBAN 4E INSECTICIDE	211.230
		LORSBAN 4E-HF	1139.008
		LORSBAN 4E-SG	165.351
		LORSBAN-4E	1684.104
		NUFOS 15G	172.500
		NUFOS 4E	71.174
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	61.691
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	137.208
		LORSBAN 4E-HF	732.741
		LORSBAN-4E	102.551
	ALFALFA	LOCK-ON INSECTICIDE	376.020
		LORSBAN-4E	512.930
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	2004.701
		LORSBAN 4E-HF	54.704
		LORSBAN-4E	227.204
	ALMOND	LORSBAN-4E	1171.871
	APPLE	LORSBAN ADVANCED	274.188
		LORSBAN-4E	1418.546
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	805.239
		LORSBAN-4E	287.033
	CORN FOR/FOD	LORSBAN 15G GRANULAR INSECTICIDE	614.400
		NUFOS 15G	1459.500
	GRAPE, WINE	LORSBAN ADVANCED	1939.972
	WALNUT	GOVERN 4E INSECTICIDE	854.675
		LORSBAN 4E INSECTICIDE	777.304
		LORSBAN 4E-HF	95.700
		LORSBAN ADVANCED	108.924
		LORSBAN-4E	1443.727
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOVERN 4E INSECTICIDE	2269.902
LORSBAN 4E INSECTICIDE		530.565	
LORSBAN 4E-HF		1716.455	
LORSBAN-4E		6514.703	

Chemical Name	Commodity	Product Name	Lbs AI Applied
	UNKNOWN COMMODITY – Total Pounds Chlorpyrifos Applied		4236.970
	ALFALFA – Total Pounds Chlorpyrifos Applied		3237.250
	ALMOND – Total Pounds Chlorpyrifos Applied		1171.871
	APPLE – Total Pounds Chlorpyrifos Applied		1692.734
	CORN – Total Pounds Chlorpyrifos Applied		3166.172
	GRAPES – Total Pounds Chlorpyrifos Applied		1939.972
	WALNUT – Total Pounds Chlorpyrifos Applied		15284.456
	Total pounds chlorpyrifos applied (2004 - 2009)		30,729.426

The Coalition determined that the most efficient and effective method of outreach is to target specific members who have used chlorpyrifos in the past two years and to contact both the growers and associated grower permittees. Based on results from general surveys, approximately 35.5% of the member acreage utilizes recirculation and/or tail water return systems or report no runoff. The Coalition anticipates that targeted outreach will increase the use of irrigation tail water management practices within Littlejohns Creek @ Jack Tone Rd (see the SJCDWQC General Survey Summary Report submitted on December 30, 2008 for details on the management practices within this subwatershed).

As part of the first year of the Management Plan process, individual surveys must be completed by targeted growers. The Coalition sent out mailings to the sixteen targeted growers in early January to invite members and their associated permittees to a meeting on January 25, 2010. The mailing included a meeting agenda and individual management practice survey to be filled out during the meeting. At the meeting, Coalition representatives presented an overview of the Coalition’s purpose, current water quality issues, and status of the ILRP. Various management practices that are effective in reducing runoff of water and sediment that contribute to high priority exceedances, specifically related to chlorpyrifos, diazinon, copper, and algae toxicity, were discussed. The attendees at the meeting operate mostly orchards and vineyards. Therefore, time was spent to address walnut blight management practices. Focus was also on drift issues and concerns including minimizing spray drift by spraying in favorable conditions, using appropriate nozzle sizes and spray pressures, and maintaining low speeds when applying by ground (6 mph). Additionally, due to the high number of algae toxicities in the subwatershed, herbicide use was also addressed. Although the meeting focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including diazinon and copper exceedances, *S. capricornutum* toxicity, and exceedances of the *E. coli* and DO WQTLs. Surveys have been completed and returned for twelve members that document members’ current practices and indicate which recommended practices growers anticipated implementing in the upcoming year. The Coalition is in the process of compiling and assessing the surveys.

The Coalition contacted sixteen growers within the Littlejohns Creek subwatershed and twelve members completed and returned surveys. The Coalition plans to follow up with the four outstanding members with phone calls and/or additional mailings.

Because these meetings occurred prior to the irrigation season, the Coalition is hopeful that members will begin to implement recommended management practices during the spring of 2010. However, the Coalition understands that limited grower resources and other factors may delay implementation. Additionally, implementation of long term structural management practices will most likely take longer than two years to put into operation and will require additional tracking to document their implementation. Growers will be contacted in November 2010 to determine what practices were implemented during the 2010 irrigation year. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year. Not all growers will need to be contacted during the second fall. To obtain the information on practices implemented since the interview/meeting, the Coalition anticipates either conducting phone calls or sending out a brief letter that includes a survey for the grower to complete.

To evaluate the implementation of new management practices, the Coalition will monitor at Littlejohns Creek @ Jack Tone Rd during 2010 and 2011. Depending on when additional management practices are implemented, the Coalition may monitor through 2012 to evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or have the potential for spray drift will improve downstream water quality by the end of the second year as a high priority site subwatershed.

Diazinon

Diazinon has exceeded the WQTL of 0.1µg/L once in this subwatershed during storm monitoring on February 11, 2007. Littlejohns Creek @ Jack Tone Rd was not sampled during 2009 monitoring.

Overall, the amount of diazinon applied within the subwatershed has decreased since 2004, but pounds applied increased in 2009 compared to the two previous years (Table VI-11, Figure VI-3). The amount of diazinon use in 2004 is more than four times the amount of diazinon use in 2009, although the number of applications has remained the same (214 lbs with 5 applications in 2004 compared to 48 lbs with 5 applications in 2009, Table VI-11, Figure VI-3). In 2004 and 2009, the greatest amount of diazinon use occurred in December whereas in 2006 and 2008 the greatest use occurred in May, and in 2007 in March; no applications were made in 2005 (Table VI-11, Figure VI-3). The single exceedance occurred in February 2007, but interestingly applications had not been reported since March 2006 (Figure VI-3).

The highest application rates and largest amount of diazinon applied are associated with almonds and tomatoes (Table VI-12).

Table VI-11. Number of diazinon applications, total pounds applied, and total acres treated by month for January 2004 through December 2009 in the Littlejohns Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Diazinon Applications	Pounds Applied	Acres Treated
January, 2004	1	65.7	33
February, 2004	1	26.9	18
May, 2004	1	10.0	10
December, 2004	2	111.6	75
January, 2006	1	52.1	35
February, 2006	1	16.0	8
May, 2006	4	66.6	5.1
March, 2007	1	16.0	8
April, 2007	1	1.6	3
May, 2007	3	8.9	1
June, 2007	1	1.5	0
April, 2008	2	9.7	2.5
May, 2008	3	10.1	2.5
March, 2009	1	16.0	8
December, 2009	4	31.8	32
Summaries by Year			
2004 Total	5	214.2	136
2006 Total	6	134.7	48.1
2007 Total	6	27.9	12
2008 Total	5	19.7	5
2009 Total	5	47.8	40
Total	27	444.3	241.1

Figure VI-3. Pounds of diazinon applied within the Littlejohns Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2009. Asterisk (*) denotes months with exceedances.

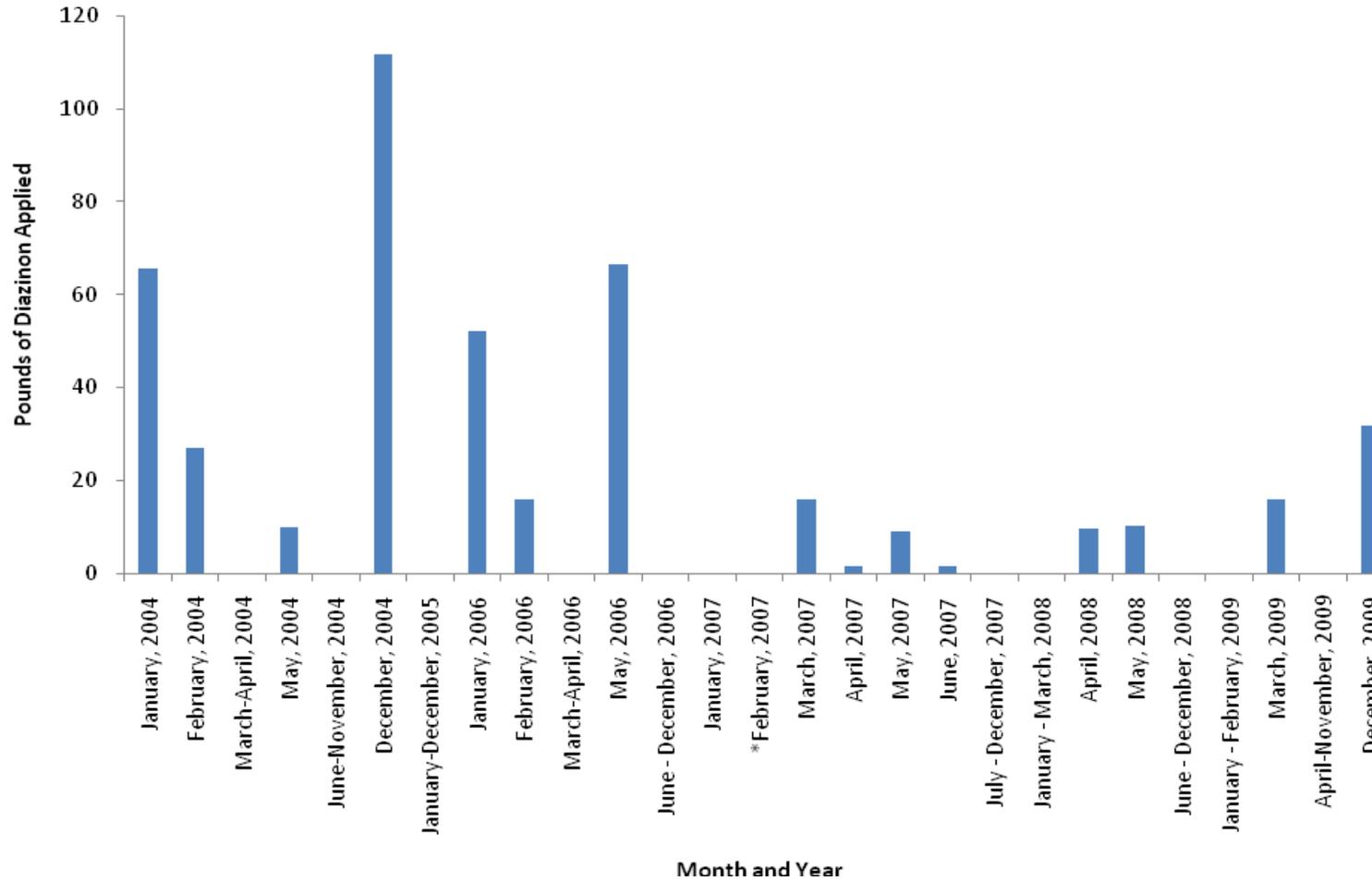


Table VI-12. Total pounds active ingredient (AI) applied for diazinon based on PUR data from 2004-2009 within the Littlejohns Creek @ Jack Tone Rd subwatershed. "Unknown Commodity" is listed as the commodity for crops that were not identified in the PUR data.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIAZINON	UNKNOWN COMMODITY	DIAZINON AG500	26.887
		DIAZINON AG500 INSECTICIDE	65.723
		GOWAN DIAZINON 4E	9.996
	ALMOND	DIAZOL AG 500	111.623
	ALMOND	DIAZINON AG 500	52.091
	CHERRY	DIAZINON 50W	48.000
	NECTARINE	DIAZINON AG 500	15.875
	PEACH	DIAZINON AG 500	15.875
	TOMATO	DIAZINON 50W	78.500
		DIAZINON AG 500	19.737
UNKNOWN COMMODITY – Total Pounds Diazinon Applied			102.606
ALMOND – Total Pounds Diazinon Applied			163.714
CHERRY – Total Pounds Diazinon Applied			48.000
NECTARINE – Total Pounds Diazinon Applied I			15.875
PEACH – Total Pounds Diazinon Applied			15.875
TOMATO – Total Pounds Diazinon Applied I			98.237
Total pounds diazinon applied (2004 - 2009)			444.307

There were no reported applications of diazinon for seven months prior to the single exceedance in February 2007. Consequently, the source of the diazinon exceedance is unknown. The Coalition is focusing its outreach to address irrigation and storm water management. Individual contacts occurring within this subwatershed are described under the chlorpyrifos outreach section above and include discussions of diazinon exceedances and the above management practices.

Priority C Constituents

Copper

Copper has exceeded the WQTL five times in this subwatershed from 2004 through 2008. Littlejohns Creek was not sampled during 2009 monitoring. The Coalition uses a combination of monitoring data and evaluation of PUR data to identify possible sources.

PUR data are reviewed for the number of monthly copper applications, pounds active ingredient (AI) applied, and acres treated (Table VI-13, Figure VI-4). Overall, the amount of copper applied within the subwatershed has remained relatively high since 2005. The amount of copper used in 2009 was more than the amount of copper used in 2004 and significantly more than the amount used in 2008, but was less than peak copper use in 2005 (Table VI-13, Figure VI-4). In 2004-2009 the greatest amount of copper use consistently occurred in April with the single exception of 2008 when the greatest use occurred in March (Table VI-13, Figure VI-4). Not all exceedances occurred during months of the greatest amount of use (Figure VI-4).

The Coalition also used PUR data to determine which crops receive the most applications. The highest application rates are associated with walnuts, tomatoes, and grapes (including wine and raisin) and the largest amount of copper applied from 2004 through 2009 is to walnuts, tomatoes, almonds, and grapes (Table VI-14). The most common products used in this subwatershed containing copper are Dupont Kocide and Kocide (Table VI-14).

Table VI-13. Number of copper applications, total pounds applied, and total acres treated by month for January 2004 through December 2009 in the Littlejohns Creek @ Jack Tone Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
January, 2004	2	324.7	85
February, 2004	5	219.1	142
March, 2004	25	4208.2	1076.1
April, 2004	33	9725	2036.5
May, 2004	3	1007.9	84
September, 2004	9	501.3	377.5
October, 2004	5	274.8	139
November, 2004	3	406.2	90
December, 2004	3	1450.5	125
February, 2005	1	33.2	8
March, 2005	25	3729.3	814.8
April, 2005	60	16329.5	3082.7
May, 2005	43	10457.7	2181.45
June, 2005	13	816.5	461.3
October, 2005	3	229.6	187

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
December, 2005	5	600.7	116
January, 2006	2	568	85
February, 2006	1	33.2	8
March, 2006	7	376.7	162
April, 2006	48	10962.6	1866.05
May, 2006	35	8636.7	1762.2
June, 2006	8	1188.3	562
July, 2006	6	609.8	396
August, 2006	3	251.7	106
September, 2006	7	358.4	257.5
October, 2006	7	465.1	299
January, 2007	1	581	180
February, 2007	1	1.6	3
March, 2007	15	2852.7	522
April, 2007	64	14310.4	2431
May, 2007	10	3285.9	522
June, 2007	1	61.6	40
February, 2008	2	4.3	6
March, 2008	12	894.6	220
April, 2008	8	852	241.5
May, 2008	1	294.7	60
January, 2009	5	1697	393
February, 2009	2	272.7	260
March, 2009	11	3582.7	391.8
April, 2009	44	11365.7	4744.4
May, 2009	9	2645.5	550
December, 2009	4	182.6	32
Summaries by Year			
2004 Total	88	18117.7	4155.1
2005 Total	150	32196.5	6851.25
2006 Total	124	23450.5	5503.75
2007 Total	92	21093.2	3698
2008 Total	23	2045.6	527.5
2009 Total	75	19746.1	6371.2
Total	552	116,649.7	27,106.8

Figure VI-4. Pounds of copper applied within the Littlejohns Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2009. Asterisk (*) denotes months with exceedances.

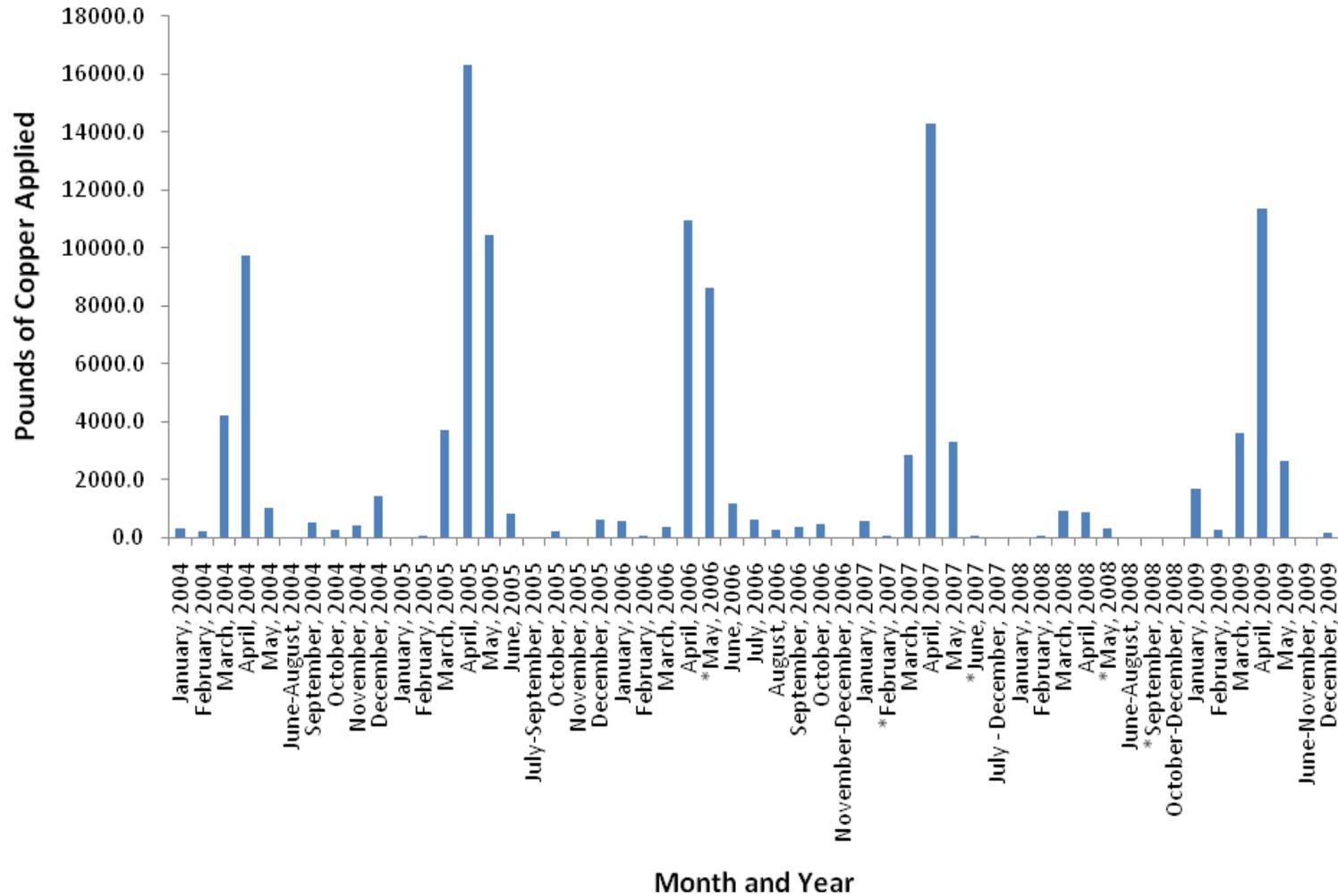


Table VI-14. Total pounds active ingredient (AI) applied for copper based on PUR data from 2004-2009 within the Littlejohns Creek @ Jack Tone Rd subwatershed. "Unknown Commodity" is listed as the commodity for crops that were not identified in the PUR data.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALMOND	KOCIDE 2000	581.04
		KOCIDE DF	1072.044
		NORDOX 75 WG	1787.07
	APPLE	KOCIDE 101	36.84
		KOCIDE DF	112.472
	CHERRY	KOCIDE 101	1447.96
		KOCIDE 4.5 LF	337.7
		NU-COP 50DF	30.8
		TRIANGLE BRAND COPPER SULFATE INSTANT POWDER	990
	GRAPES	CHAMP FORMULA 2 FLOWABLE	92.96
		KOCIDE 101	1197.7196
		TENN-COP 5E FUNGICIDE/BACTERICIDE	306.17857
	GRAPES, WINE	COPPER-COUNT-N	1.55
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	1670.8484
		NU-COP 3L	95.28218438
		TENN-COP 5E FUNGICIDE/BACTERICIDE	9.759428
	NECTARINE	NORDOX 75 WG	182.5664
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	KOCIDE 2000 T/N/O	5.918
		PHYTON-27 BACTERICIDE & FUNGICIDE	2.8281975
	N-OUTDR TRANSPL	KOCIDE 2000	27.43
		KOCIDE 2000 T/N/O	12.37
		PHYTON-27 BACTERICIDE & FUNGICIDE	0.48
		PHYTON-27 FUNGICIDE	2.57107116
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	KOCIDE 101	976.9670428
	PEACH	NORDOX 75 WG	182.5664
	PEAR	KOCIDE 101	35.497
		KOCIDE DF	13.815
	PEPPERS (FRUITING VEGETABLE), (BELL, CHILI, ETC.)	KOCIDE DF	200.4223213
	TOMATO	HYDROX	101.64
		KOCIDE 101	1013.917111
KOCIDE 4.5 LF		164.8627035	
KOCIDE DF		2356.282007	
NU-COP 50DF		758.45	
NU-COP 50WP		40.05897	

Chemical Name	Commodity	Product Name	Lbs AI Applied
	TOMATOES, FOR PROCESSING/CANNING	KOCIDE 4.5 LF	164.3115866
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	241.725212
		KOCIDE DF	391.7584
		NU-COP 3L	41.32
		NU-COP 50DF	174.79
	Unknown	CHAMP FORMULA 2 FLOWABLE	438.48705
		CHAMPION WETTABLE POWDER	154
		CHIPCO COPPER SULFATE CRYSTALS	846.45
		KOCIDE 101	9956.1
		KOCIDE 2000	106.524
		KOCIDE DF	2890.0366
		NORDOX 75 WG	218.14
		NU-COP 50DF	765.38
		PHYTON-27 BACTERICIDE & FUNGICIDE	0.32138256
		TENN-COP 5E	109.441476
	WALNUT	BASIC COPPER 53	2156
		BLUE SHIELD DF	92.4
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	810.228
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	3026.7744
		HYDROX	646.8
		KOCIDE 101	4592.28
		KOCIDE 2000	1620.46
		KOCIDE DF	3714.4544
		NORDOX 75 WG	142.63
		NU-COP 50 WP	723.8
		NU-COP 50DF	18335.471
		BLUE SHIELD DF	123.2
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHAMP FORMULA 2 FLOWABLE	385.5425963
		DUPONT KOCIDE 101 FUNGICIDE/BACTERICIDE	492.8
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	687.564
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	835.04
		HYDROX	2718.1
		KOCIDE 101	24467.42965
		KOCIDE 2000	163.08
		KOCIDE DF	12799.0821
		NU-COP 50 WP	612.15

Chemical Name	Commodity	Product Name	Lbs AI Applied
		NU-COP 50DF	5156.761176
		ALMOND – Total Pounds Copper Applied	3440.154
		APPLE – Total Pounds Copper Applied	149.312
		CHERRY – Total Pounds Copper Applied	2806.460
		GRAPES, WINE – Total Pounds Copper Applied	3374.299
		NECTARINE – Total Pounds Copper Applied	182.566
		N-OUTDR TRANSPL – Total Pounds Copper Applied	51.597
		ONION (DRY, ETC.) – Total Pounds Copper Applied	976.967
		PEACH – Total Pounds Copper Applied	182.566
		PEAR – Total Pounds Copper Applied	49.312
		PEPPERS – Total Pounds Copper Applied	200.422
		TOMATO – Total Pounds Copper Applied	5449.116
		UNKNOWN COMMODITY – Total Pounds Copper Applied	15484.880
		WALNUT – Total Pounds Copper Applied	84302.048
		Total pounds copper applied (2004 - 2009)	116,649.699

The Coalition will continue with its strategy outlined above under the chlorpyrifos outreach section. Orchard and vineyard operators will be advised to consider irrigation tail water management to prevent copper from entering the waterway with runoff. Storm runoff management relevant to copper applications will also be discussed to prevent the winter exceedances. Individual contacts occurring within this subwatershed will include discussions of copper exceedances and the above management practices.

Priority D Constituents

Priority D Constituents listed under the Littlejohns Creek Management Plan are water column toxicity to *Selenastrum* and sediment toxicity to *Hyaella*. Although the Coalition will continue to collect these data, the constituents will remain low priority. Toxicity to *Selenastrum* has occurred five times in the Littlejohns Creek subwatershed from 2004-2009. Toxicity to *Hyaella* has occurred two times. One occurrence of toxicity to *Selenastrum* has been associated with a copper exceedance.

Selenastrum toxicity

The Coalition's strategy for addressing *Selenastrum* toxicity is to focus on copper exceedances. If copper can be prevented from entering the waterways, toxicity could be reduced or eliminated. *Selenastrum* toxicity has been highlighted in recent meetings by Coalition representatives and management practices relevant to toxicity, such as water retention, have been discussed as well. The Coalition will be sampling for *Selenastrum* toxicity as a part of 2010 MPM. If copper exceedances subside, but toxicity persists, the Coalition will assess other herbicides used within the subwatershed as potential causes.

Priority E Constituents

Priority E Constituents listed under the Littlejohns Creek Management Plan are DO, and *E. coli*. Although the Coalition will continue to collect these data, the constituents will remain low priority for the foreseeable future.

Evaluation

Littlejohns Creek is one of the second three priority site subwatersheds within the SJCDWQC and is in its first year of focused outreach (2010-2012). The Coalition's strategy for the Littlejohns Creek @ Jack Tone Rd subwatershed has been to target growers who have applied chlorpyrifos in the past two years. Focus will be on tail water management practices and minimizing spray drift. Outreach includes grower notification, management practice education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practice implementations and assess future planned implementations are in the process of being filled out and will be completed by the end of October 2010. The Coalition will then assess these results and plan the final stages of outreach including re-contacting growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.